

8COVILL'S PHOTOGRAPHIC SERIES. NO. 4.

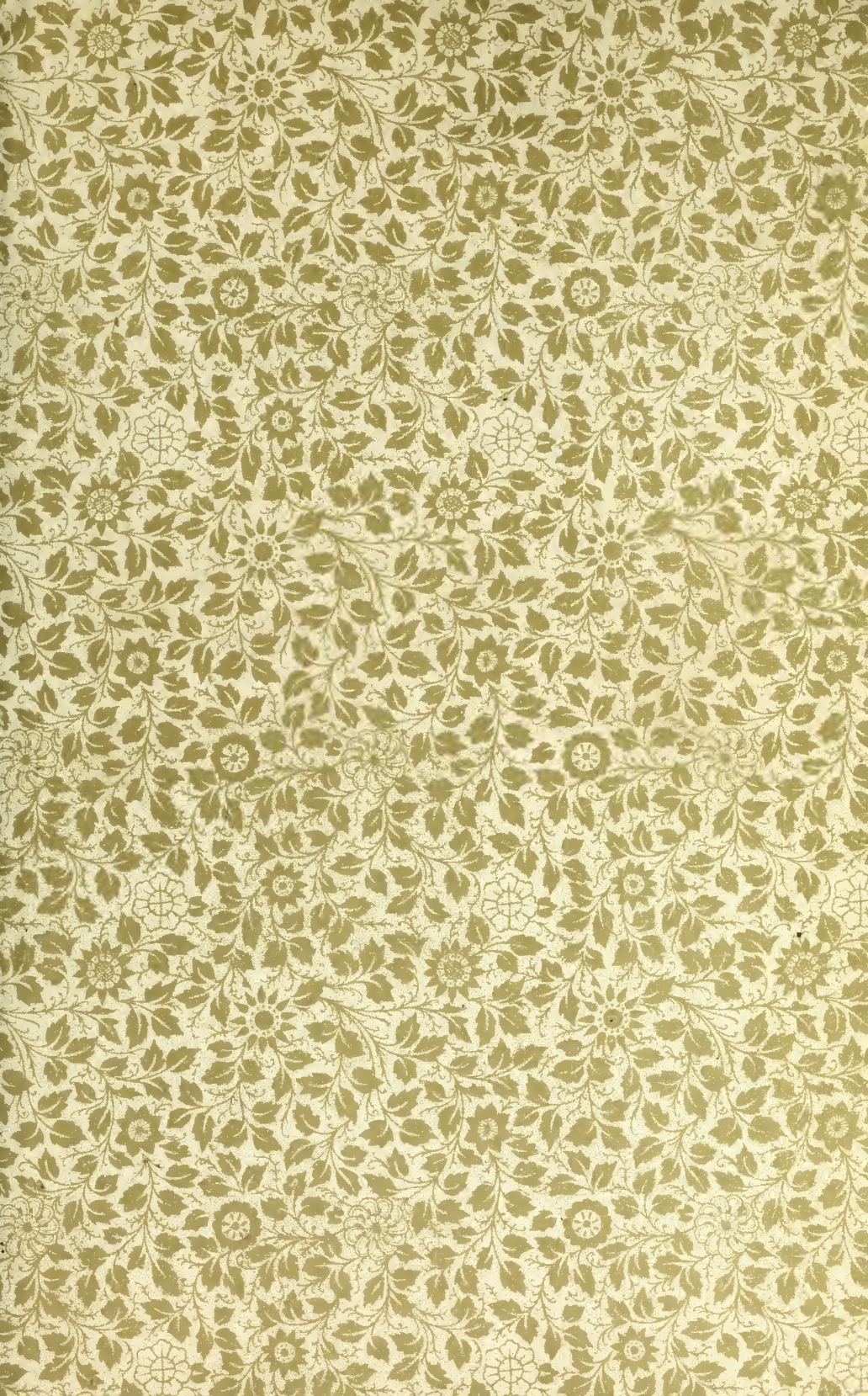
How to Make Pictures:

EASY LESSONS FOR THE

AMATEUR PHOTOGRAPHER.

HENRY CLAY PRICE.







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at look. -
up/white prints.*

M. A. SEED DRY PLATE CO'S

PYRO AND SAL SODA DEVELOPER.

MARCH, 1887.

PYRO STOCK SOLUTION.

Sulphite Soda Crystals,	- - -	6 ounces.
(Or Granulated, 4 ozs.)	- - -	
Pyrogalllic Acid,	- - -	1 "
Water (Ice or Distilled),	- - -	16 "

SAL SODA STOCK SOLUTION.

Sal Soda,	- - - - -	4 ounces.
Water,	- - - - -	16 "

TO DEVELOP.

Just before development, add to six, eight or ten ounces of water, one ounce of Pyro Solution and one ounce of Sal Soda Solution.

NOTE.—The amount of water used depends upon its temperature. If ice water is used, 6 ounces will be right. If the water is over sixty degrees, 8 ounces should be used. If over eighty degrees, 10 ounces. We prefer cool development, as it gives the finest effect.

THIS DEVELOPER

may be used repeatedly, but will work slower and with more intensity when old. Therefore, the fresh developer is best for short exposure, and the old is better if the plate has been fully timed. In using the Sal Soda Developer it is very important to carry the development far enough, until the lights have sufficient intensity when examining the plate by transmitted light.

The quantity of Pyro must be according to the density of the negative wanted.

If the negative is too strong, use less Pyro. If not strong enough, more.

FIXING BATH.

Alum,	-	-	-	-	-	-	-	$\frac{1}{2}$ oz.
Hyposulphite of Soda,	-	-	-	-	-	-	-	5 ozs.
Water,	-	-	-	-	-	-	-	1 pint.
<i>Filter,</i>								

Leave the plates a few minutes longer in the bath than they require for fixing. **This is important, as the permanency of the negative depends upon it.**

up/grade catalog
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DEFECTS IN DRY PLATE NEGATIVES AND THEIR REMEDIES.

Want of Detail in Lights and Shadows.

It is generally supposed to be due to under exposure, but this is not always the case. For instance, I expose a plate four seconds. It develops in from one to two-and-a-half minutes, and the result is with the above defect. It is a proof that I have used more Pyro than the plate required. Now I will try again. I take a plate out of the same box, give three seconds exposure, use only half the amount of Pyro Stock Solution to the usual amount of Sal Soda Stock Solution, and the negative will develop in three or three-and-a-half minutes; result, a fine negative in definitions and brilliancy. On the other hand, a negative may have precisely the same appearance as the foregoing one, but it took from five to ten minutes to develop. Try another and you double the amount of exposure.

Granularity of Negative.

This defect generally appears during the warm weather. There are two causes—one the result of insufficient mixing of the developer before pouring over the plate, *especially if too strong and too high temperature*. REMEDY—Dilute the developer with water one-third, or use ice-water without the dilution.

Another cause is the fixing bath being too milky, unrough containing too much alum. REMEDY—Never use a fixing bath which is muddy. Filter it.

FLATNESS OR WANT OF HIGH LIGHTS IN NEGATIVES.

This generally is due to overtinting. The more rapid the plate, the less latitude you have in time of exposure. A slower plate always gives a wider range. Too much Sal Soda produces flatness, also a developer weak in pyro.

Small, Round, Sharply Defined Transparent Spots.

Some photographers wet their plates before applying the developer. If this is not thoroughly done, air bubbles will be formed on the surface, and hence cause the spots above referred to. With our plates wetting is unnecessary.

Another cause of similar spots is using water for the developer which contains vegetable matter, causing it to bubble more or less while pouring it on the plates. **REMEDY**—Use only ice or distilled water.

• On account of the extreme rapidity of our plates, great care should be taken that they are developed in a suitable light.

TEST.—Expose one-half of a plate three minutes to your light in developing room and develop. If the part exposed is as clear as the unexposed part your light is safe.

Respectfully,

M. A. SEED DRY PLATE CO.

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PICTURES MADE BY
AMATEUR PHOTOGRAPHERS,
With Scovill's Detective Camera.



With Waterbury Lens Accompanying
SCOVILL'S TEN DOLLAR OUTFIT.

HOW TO MAKE PICTURES:

EASY LESSONS

FOR THE

mateur Photographer

BY

HENRY CLAY PRICE.

FRANKLIN INSTITUTE
FOURTH EDITION.

NEW YORK:
SCOVILL MANUFACTURING COMPANY.
W. IRVING ADAMS, AGENT.
1887.



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“ There is a pleasure in the pathless woods,
There is a rapture on the lonely shore,
There is society where none intrudes,
By the deep sea, and music in its roar ;
I love not man the less, but nature more,
From these our interviews, in which I steal
From all I may be, or have been before,
To mingle with the universe, and feel
What I can ne’er express, yet cannot all conceal.”



For many years amateur photography has been held in high estimation throughout Great Britain, as a means of recreation by men eminent in the law, in literature, and in science. The introduction into America of gelatine plates made possible the production of the highest class pictures through the medium of an outfit so light in weight that many of the fair sex have become expert in its use. More recreation combined with invigorating exercise is needed in this country, and amateur photography presents the highest claim for consideration, as it is pleasant, educating and health giving, without the danger of over exertion which attend many forms of out-door exercise. It is a sure cure for mental weariness, and no one, whether young or old, who has an artistic appreciation of the beautiful while sauntering through green fields or by the river side with the eye alert for the picturesque, ever discovering,

comparing and admiring, can fail to be interested in the practice of this refined accomplishment. It aids the student in the study of botany, mineralogy, and what not? and enables him to make comparison with others separated from him by distance.

Wide-awake correspondents and authors now enclose with their manuscript and send to the publisher photographic prints or negatives from which engravings are made for the illustration of their articles or stories. To-day the best magazines and dailies have their "artist on the spot," equipped with a photographic outfit. Renowned artists with a camera which looks like a hand-satchel, photograph without exciting the suspicion of the unconscious subject, the beautiful, quaint, or repulsive features which, in due time, will be copied on canvas. There are many who are connoisseurs of art; artists they would be, but cannot, as not even the pencil will do their bidding. Commend to them the camera, which will treasure what they longed to be able to represent. Similarly equipped the detective is more than ever to be feared by the criminal. Architects, manufacturers, real estate or insurance agents, and men engaged in other branches of business employ the Camera for a variety of purposes.

Photographs of the gems of scenery to be found in foreign lands, or discovered about the old hillside farm during the summer holidays, add to the attraction of the home, and are prized for the reminiscences which are associated with each one. These pictures are handsomely framed or gathered in portfolios and albums, and no power of description compares with them. From the same negatives, transparencies may be made or magic lantern slides. As the latter are prepared with so little trouble, a form of parlor entertainment has been introduced which consists of the employment of a magic lantern or stereopticon, and the exhibition to a circle of friends of the pictures made and finished by the amateur himself.

The requirements for making stereoscopic pictures or photographs of microscopic objects are simple and quite inexpensive. For instantaneous photography one needs but

to substitute a quick working lens with a drop or shutter for the one in ordinary use, and to provide himself with extra sensitive plates, and the impressions of vessels under full sail, horses speeding around a race course, or even trains under full headway are fixed on the sensitive film of the plates as though the fleeting panorama had been instantly arrested. There are simple methods for copying manuscripts, engravings, and for enlarging small pictures. To show a house, a bit of real estate, cattle, horses, or a pile of logs ; a piece of mechanism or machinery ; any new design of furniture, hangings, carpets, or ten thousand other objects, by means of photography, when other methods would be quite expensive or unavailable, is a happy subterfuge. Pictures were the symbols earliest used to express thought unuttered, and they ever have been the language universal of the world.



HOW TO MAKE PICTURES.

CHAPTER I.

DESCRIPTION OF APPARATUS.

It has been the fortune of the writer to instruct many pupils in the lessons of amateur photography, and all of the success that has been attained must be due to the use of simple but explicit language. In these chapters I shall try to leave nothing to be guessed at, nor any chance for doubt; but beyond the line of actual experience and knowledge I shall not venture, hence the apparatus or other parts of an outfit here described or mentioned will be such as I am familiar with through use, and known to me to be reliable—perfectly so.

In selecting such articles—having learned by experience the importance, the *necessity*, of a good equipment—I ask every amateur to purchase what is warranted by a house of known standing and veracity.*

In taking pictures the negative is secured. This passes through the various stages of development, and then the prints are made, which are mounted upon card-board to suit the

* This caution would not be given if worthless outfits had not been thrust upon the unwary to their great dissatisfaction and to the detriment of reliable articles.

taste. The first operation—that of producing the negative—is all that need be done at once. The other operations are subject to the pleasure and convenience of the amateur. The accompanying illustration shows all that is needed to be carried about, and the comfort and ease with which it is done.



In the case may be found a lens, the camera and holders, and the focusing cloth, while in the same hand is grasped a tripod neatly folded up, which may be used in this shape as a helper when climbing steep ascents, or possibly as a means of defence from obtrusive dogs in wayside orchards.

By way of contrast with the careless, easy attitude of this figure, glance at that of the old veteran, as he moved wearily and heavily laden, to practice his beloved art.

If seen now with his old-time luggage, it would be averred that he had been detained by a twenty years' sleep with Hendrick Hudson's crew.

A Good Apparatus Outfit.—

Less than four years ago it was announced that a good outfit, every article of it warranted, consisting of a camera, with accompanying double dry-plate holder, for making pictures 4x5 inches, a single achromatic lens, a carrying case in which to stow away and transport the camera, plate holders and lens, and a tripod, would henceforth be sold for \$10.

The price astonished every one, photographers especially, although the outfits of this kind were designed particularly for the use of amateurs.

"Think," said they, "of procuring a serviceable lens alone for that sum."



Since the introduction of the cheap outfits, I have seen, in the busy city of Waterbury, pile upon pile of lens tubes with the name "Waterbury"

stamped upon them, every one perfect in finish. When brought into use and tested by experts, these lenses have proved to be possessed of something more than beauty. They are not mere toys, but, on the contrary, are of the highest class, and marvels of cheapness. (Quite

recently stops have been made and introduced into the various sizes of the Waterbury lenses.) Not one of them has ever been sent back to the makers as falling short of what it is guaranteed to do, and therefore I give this part of the outfit particular attention.

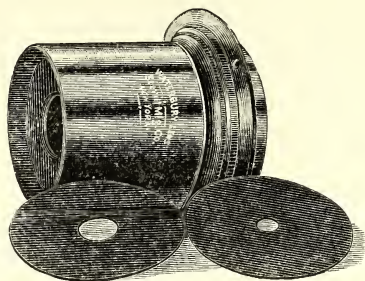


FIG. 1.

Naturally, when one has discovered the object or chosen the scene that he is desirous of photographing, the carrying case is set down, and then follows the undoing and setting up of the Taylor tripod on which the camera is to be placed and fastened. This tripod is firm while in position, and compact when folded up, and none has ever been made to excel it in these properties.

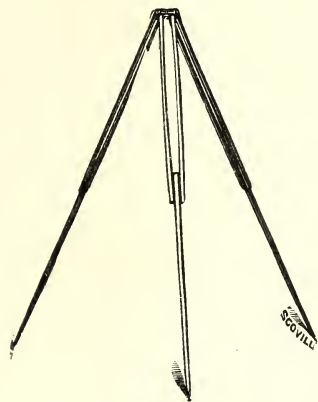


FIG. 2.

Its three legs of maple are composed of three pieces hinged together. To set it up, unfold the two outside pieces of a leg, bending them back toward each other until the two dowel pins in the third piece fit into the two holes in the outer joints. Of course this is repeated with each leg. Then press together the two nearly parallel pieces, and hold the brass top (which is usually packed

inside of the carrying case), so that two of its pins will enter the holes or sockets on the outer side of the joints; release the

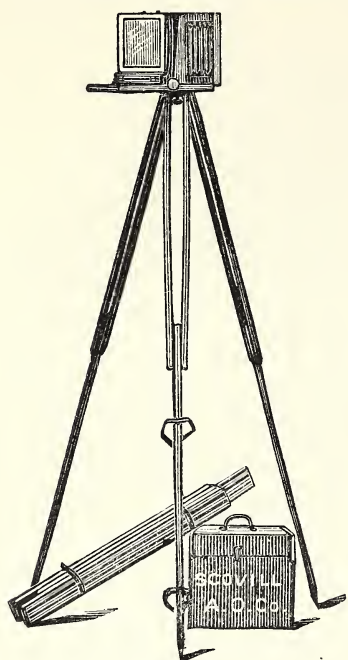
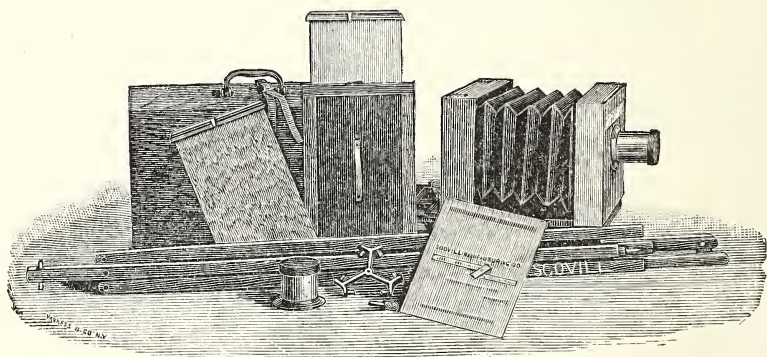


FIG. 3.

fitted to the Favorite Camera has kits for making smaller-

pressure, and the leg will be fastened to the top. Thus, also, arrange the two remaining legs, and the tripod is ready for its burden. A few turns of the screw will bind the camera firmly to the tripod. Fig. 3 shows their appearance; while beneath, as a contrast, are seen the folded tripod and the carrying case holding the balance of the outfit.

The Favorite Camera is as light as is consistent with stability, and is compact when folded. In addition to the folding platform it is provided with the vertical shifting front, and swing back; also the patent latch for fastening the platform. The dry-plate holder



SCOVILL FAVORITE OUTFIT, COMPLETE.

sized pictures when it is desirable to do so, and has the registering or so-called "record" slides described in Chapter III.

In every respect these cameras are neat, good and serviceable. So it is with the rest of the outfit. The jury at the American Institute examined them in connection with the more showy apparatus, and their award of excellence covers both grades. (Extract from the judge's report at the Institute on the apparatus just described: "*Nothing superior to it can be found anywhere. For the attention given to outfits for amateurs, their benefit to the young, especially in the direction of encouraging art studies and a better appreciation of nature's beauties; for this, as well as the whole exhibit, we recommend that a medal of superiority be awarded,*" etc., etc.)

Many an amateur makes a beginning with one of the cheap outfits, and, having achieved success, chooses something finer and higher priced.

Some there are who have but little time for recreation, and they will not care to expend more than a small sum; but amateur photography is a luring art, and the desire is easily awakened for the gems of the camera-maker's skill. A feeling of pride concerning the equipment used, and emulation similar to that which has led to the construction of superbly finished yachts, is sure to be aroused among patrons of culture, leisure, and wealth.

CHAPTER II.

FILLING THE PLATE HOLDERS.

BEFORE starting out to take pictures, the plate holders must be filled with gelatine plates. Some of them hold two, and hence, if but two views are to be taken before the return, it will be best to fill but a single holder. If the amateur thinks to secure more than two picture impressions, he must govern himself accordingly in putting sensitive plates into the holders. As it is essential that this operation of filling the holders should be done in a room or closet where all other than ruby light is excluded, bear this fact in mind before leaving your base of supplies. It frequently occurs that an amateur away from home for a considerable length of time, has no chance of darkening a room sufficiently in which to develop the exposed plates, or to refill his holders. In this case he must provide himself before starting with a *number* of holders filled with gelatine plates.

The exclusion of *white light* from the room in which the plates are either placed in the holder, or afterward developed, should be both *emphasized* and *italicised*. After you have closed the door and believe the room to be dark, do not rest satisfied; stuff the chinks and crannies. Overhead, underneath, everywhere, stop out the light. Look through the keyhole! there may not be a reporter outside, but there is a great inquisitor who must be barred out, and it can be done effectually. Having faithfully attended to the imperative duty of securing perfect darkness, welcome the light which will not injure the sensitive film on the plates. This can be admitted from without by light shining through a pane of ruby glass, or ruby paper over white glass; but the more common

and preferable light is that from one of the ruby lanterns designed especially for this purpose (see Fig. 4); so I will suppose you are provided with one.*

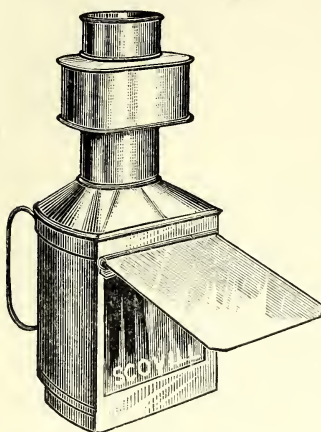


FIG. 4.

Put a light in it and close it up. Now, take a package of gelatine plates and carefully cut away the original wrapper in which they are put up by the maker. Do this in such a way as to leave the brand or label on the cover of the box. Take the telescopic lid off the box, lift out the package inside, undo the other paper wrapper, and you have now come to the glass plates, with one side sensitized, which were packed with tissue paper between them.

Take out a plate, handling it as shown in Fig. 5, which is the proper way, and dust off its glossy sensitive surface very gently with a camel's-hair brush. This is done to guard against the possibility of any speck or particle of dust being on its surface, the presence of which would eventually make a spot or defect in the finished picture. It would not be amiss to dust off both sides of the plate.

If you cannot detect the surface having the coating of gelatine otherwise, hold the plate between you and the ruby lantern, and you will then perceive which side has been coated. Be careful to keep everything but the camel's-hair brush away from the surface of the gelatine plate.

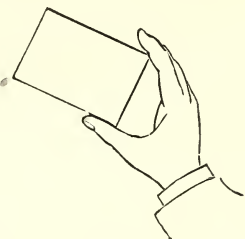


FIG. 5.

Take up, with the left hand, one of the double plate hold-

* The Scovill Peerless Lantern has recently been introduced. It is more expensive than the one here illustrated, but has far greater illuminating power

ers, *A*, shown in Fig. 6, and pull out the slide *C*, laying it to one side. In one of the outer grooves of the holder place a gelatine plate, with its sensitive side facing out. Fig. 7 represents the end of a Scovill Patent Plate Holder, and the shaded portion depicts the sensitive plate, while the dark lines denote the position of the sensitive surface.

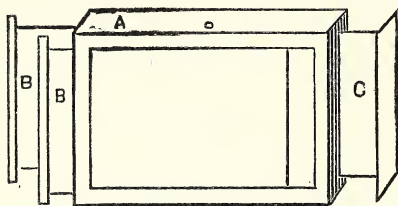


FIG. 6.



FIG. 7.

Take up another gelatine plate, or rather handle it now like an expert, and place it in the remaining unfilled outside groove of the holder. Be sure to have the sensitive side face outward. Insert the slide *C* in the central groove of the holder, as indicated in Fig. 6, and push it clear in to the stopper. If the springs on this piece catch on the edges of the plates, bring a slight pressure to bear on them with the thumb and forefinger of the left hand, which will remove the trouble and permit the slide to be forced in to its hilt or so-called "stopper."

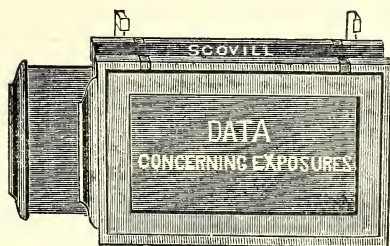
See if the slides *B B* (thus denoted in Fig. 6) are pushed in also. The purpose of the slide *C* is to keep light from passing through from one plate to the other during the time the first plate is going through the operation commonly called "taking the picture." Fogging is thus again avoided.

Another mission of the slide *C* is to keep the plates in focus by means of the springs on its surface. When all of the slides are pushed in as far as they were designed to go, the holder should be absolutely light-tight. It should not only be so when it is sold, but it ought to remain so, and "there's the rub" with a cheap holder. A good holder is a prime fac-

tor of an outfit of sterling worth. Better have none at all than a poor one.

But to recur, the slide *C* should only be taken out in order to remove the gelatine plates ready for development, or to place fresh ones in the holder, and the slides *B B* only drawn out during an exposure.

The Daisy Dry Plate Holder more recently introduced has



become equally popular with the old pattern. It opens like a book when the dry plates are being put into or taken out of it, and is so arranged that light cannot penetrate from one side to the other. Kits of lesser

sizes may be carried in the outside frame, which permits two plates of different sizes to be used in such a holder.

After filling the plate holder or, if you so choose, several of them, rewrap the remaining gelatine plates of the undone package, put them in the card-board box, replace the cover, and hide away the plates from their arch enemy, *white light* so great a blessing elsewhere. It is time to come out of seclusion, so throw open the door and put out the lantern light. There are worlds you are sighing to conquer. Away! be off to them, and study what each horizon bounds. Learn like the photographer in his study of physiognomy, that there is nothing duplicated under the sun.

CHAPTER III.

TAKING THE PICTURE.

WITH the position chosen from which to take the picture—this, by the way, should be selected so that the sunlight will shine from the rear, or at one side of the camera, never in front—you set up the camera and tripod, and in doing this be sure that the top of the camera is level.

Govern yourself accordingly when spreading out or adjusting the legs of the tripod to lower the camera.

If you cannot with your eye determine the true position of the camera, it would be well to carry a spirit level of vest pocket size. There are times when the camera may be pointed at a small angle upward or downward from the plane of the horizon as a variation from the rule just given, to offset which the ground glass should be swung to a vertical position.

Let me emphasize the command not to have the camera incline either to one side or the other. If the upright sides of the ground glass frame lean to one side, so will the picture.

The camera may be swung round by loosening the screw which binds it to the tripod. When swung far enough, turn the thumb screw until the camera is again fastened tightly to its support.

From out of the carrying case or some other receptacle pull the focusing cloth, throw it over the top of the camera, and gather it tightly at its sides. Under the hood thus formed thrust your head.

Do not cover the lens with the cloth.

The object of the hood is to shut out light excepting that which enters through the lens and throws a reversed picture on the ground glass, which acts like a semi-transparent mirror. Uncap the lens and draw the back of the camera towards you. After a moment your eyes will become accustomed to the

situation, and the picture will seem to have already been secured. It is not a permanent impression, but like that of the mirror. Continue to draw the back of the camera toward you, except with the so-called forward focus cameras, in which case the operation is reversed to obtain the focus, and the image will appear more distinctly on the ground glass. If you pull on the back too far, reverse the movement, as you do with a pair of opera glasses. When you see the image most clearly you have obtained the *focus*; neither the word nor the operation is difficult; a little practice will master both. While standing in the same position look all around the edges of the ground glass, and make sure that the picture is as clearly defined there as it should be. Photographers would speak of securing "good definition."

Having made sure of this, fasten the back of the camera by a turn of the clamp screw, or other means provided. Now lay aside the focusing cloth where it will be safe.

Spring back the catch on top of frame and put the ground glass and frame out of the way. Be careful not to break the former. Place the cap on the lens. Take a double dry plate holder, and turn it so that the heads of the dark slides face to the right (see *C C*, Fig. 8, showing holder in proper position). Set the holder down, and over the pins projecting from the bed of the camera, and push it gently forward until the hook from the camera catches on to the top screw.

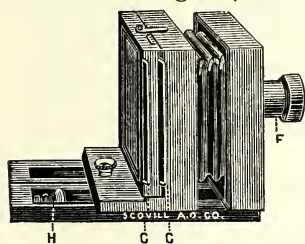


FIG. 8.

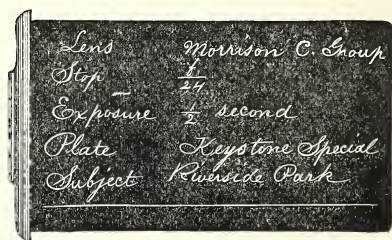
Look now to your lens to see that the cap is still on; a knock might have brushed it off. If this were to pass unnoticed, and the dark slide *C* be drawn out, one portion of the sensitive plate would necessarily catch the light before the other, with a result not at all favorable. Or, on the other hand, a longer exposure than is desirable might be given. There is a proper time to "doff the cap." It is after you have pulled out the dark slide *C*, nearest the camera (which please lay on top of

the camera), and also after you have decided how long the sensitive plate should receive light through the lens in order to get the best results on the film.

Suppose, for illustration, your subject to be a landscape, made up of sky, trees, houses, and a pond—the atmosphere clear, and the sun brightly shining. The sky will be photographed on the film very quickly, the pond not quite as rapidly, the impression of the bright colored houses will follow next, and lastly the dark green foliage.

You have in use a Morrison achromatic lens of six-inch back focus, and a stop of a quarter inch opening. (Do not be alarmed at these words, for you will or may ascertain such points about a lens when you purchase one.) The gelatine plates in use we will suppose to be what are called rapid, hence you decide upon fifteen seconds' exposure, as denoted by your watch. Uncap the lens by a quick movement, but do not jar the camera, and as soon as the allotted time has passed recap the lens, replace the watch in your pocket, and push in the dark slide with the blackboard record surface out and the light mottled side toward the plate. Very soon an amateur can learn to mark off seconds without having to verify the count by a time keeper.

A little practice of counting off the flight of seconds, when there is nothing else to do, will enable you to become an expert. Take out your pencil and make the following as the befitting record of observations:



The plate holder can now be put in the carrying case, and indeed the whole outfit be folded into its most compact

form, or the tripod and camera may be carried "shoulder arms," if the amateur expects to pitch the tripod and give battle to another surrendering scene not far distant.

Ah! by way of diversity, here is a fine marine view, with the blue sky, the broad expanse of the sea, boats at anchor, and a small dock to give the picture a finish. This is a treat! When you have secured the right focus, and start to substitute the plate holder in place of the ground-glass, recall the fact that the plate back of the record notes has on it a picture impression, and must not be used again; so the holder should be inverted. Also remember about the dark slides facing to the right. Before uncapping the lens again, calculate how long the cap should be off.

The sky casting down direct, and the water giving back reflected light, action on the sensitive film will be more rapid than in the former view, and you therefore decide upon ten seconds' exposure. Draw out the dark slide nearest the camera. Uncap the lens, count " " " " " " " " " " (10) seconds and recap. In counting, begin when you take the cap off by saying 0, 1, 2, 3, and so on. The reason for this is that by beginning with 1 2 3 and so on you do not give the full measure of time. Replace the dark slide, and return the holder, with its two hidden trophies, to the carrying case.

By this time perchance you are quite hungry, although you did not think that luncheon would be needed, so little appetite did you have before starting, but now you are certain that you will go home and see that dinner is served promptly on this day at least.

CHAPTER IV.

DEVELOPMENT OF THE PLATE.

It is not essential that the operation next in order with the gelatine plate shall follow at once, or the same day or week. The amateur can suit his convenience in the matter. Dry plates have been exposed in the Arctic Regions and developed in England. They have been used in Africa and brought home over six thousand miles, after months of travel, to be developed.

For the development, the following list of accessories are requisite: Two vulcanite trays, one four-ounce glass graduate, a minum graduate, a package of S. P. C. carbonate soda developer; and of chemicals, say, one ounce bromide ammonium, one pound hyposulphite of soda, and one pound alum.

These accessories will probably be kept where the dry plates also are stored. Into this closet or room are taken the dry plate holders containing the exposed plates, the door of the room is shut, and again all white light is barred and stuffed out. The *seance* can now go on by ruby light.

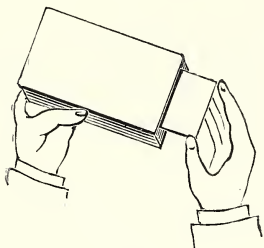
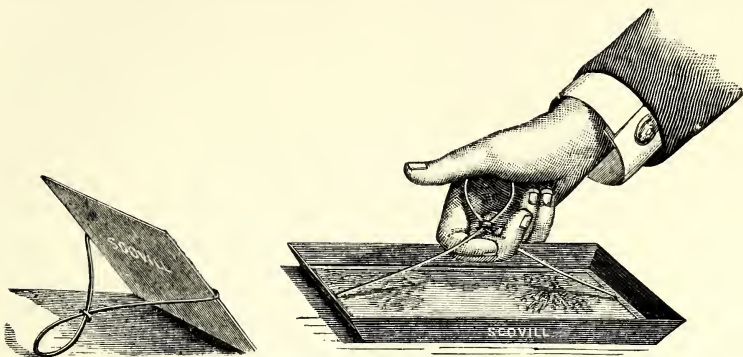


FIG. 9.

Take out the central septum (slide *C*, Fig. 6) from a holder, which latter please grasp with the left hand, as shown in Fig. 9, and, holding the right hand to within an inch of the opening end, tilt forward or raise the other end of the holder so that the gelatine plates will slide down and strike against the fingers of the right hand. Fig. 9 illustrates this also. The uppermost plate is taken out of the holder, being grasped by the thumb and forefinger of the right hand, as shown in Fig. 5, and then the holder is so inclined that the other plate will slide back into its former place.

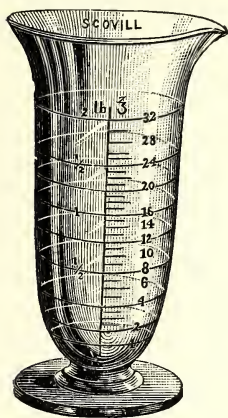
The holder can now be set aside. Place the gelatine plate in the tray, and keep the sensitive side *uppermost*. *Look to this!*



THE RUSSELL NEGATIVE CLASP AND DRYING SUPPORT.

By using the Russell Negative Clasp and Drying Support, there is no need of wetting or staining the fingers in the developer, or of even touching a plate until after it has been developed, varnished, and dried.

Put the slide *C* back into the holder. From a pitcher or glass pour clean water into the tray until it is half filled. Leave the plate in this cold water bath, and mix your developer solution as follows:



GRADUATING GLASS.

Dissolve the contents of the paper package marked No. 2 of the S. P. C. carbonate of soda developer in sixty-four ounces of water and add to two ounces of this solution two drams of the No. 1 solution. Now pour off the water from the tray, and flow over the plate the combined developing solution. If air bubbles form on the plate they must be removed by a touch of the finger or by a soft camel's-hair brush. If the plate be correctly exposed traces of the image will appear on the sensitive film in a short time, but in case they do not, pour the developing solution back into the graduate and add a little more

the developing solution back into the graduate and add a little more

of No. 2 solution (from a quarter to half an ounce) and reflow the plate with the strengthened developer. In a short time the details of the image will appear, but wait patiently until all the details are out and clearly seen in the deep shadows, and until the milky white appearance of the plate is changed to a dark gray color. The negative is then fully developed and must be washed in two changes of water, when it is ready for the "fixing" bath. Should the image on the plate flash out suddenly on flowing it with the developing solution, and continue to grow very rapidly, the plate has been over-exposed and must be quickly removed from the developing tray and placed in pure water, while a restraining solution of bromide is made as follows:

Dissolve one ounce of bromide of ammonium in eight ounces of water, and label "bromide solution." Now add a few drops of the bromide solution to the developing tray, and replace in it the partly developed plate. The development will now proceed more slowly, but if too much bromide has been added, so that the development is entirely stopped, it can be started again by adding, carefully, a little more of the No. 2 solution.

The S. P. C. pyro and potash developer is preferred by many, at least it can do no harm to give it a trial, making use of the following simple directions:

To develop a 5x8 plate, take water, two ounces; No. 1, one dram; No. 2, one dram. To give density, use more of No. 1. More of No. 1 will restrain, more of No. 2 will accelerate. This developer will be found very desirable for instantaneous exposures as it is much more energetic than the soda.

Immerse the plate in a saturated solution of alum for a moment after fixing and washing to give the negative a gray wet plate color.

Pelletone pyrogallic acid tablets,* put



* Exact style in which the genuine tablets are put up.

up in bottles, each containing 100 two-grain (*exactly* two grains) tablets of Schering's unrivalled pyrogallie acid will be found a great convenience in developing dry plates. The cut below shows the Scovill outfit of pure chemicals and accessories for making negatives.




CHAPTER V.

FIXING THE PLATE.

Pour into the unused tray enough of the hyposulphite of soda solution to half fill it, the formula for preparing which is as follows :

Water, twenty-four ounces, with four ounces of hyposulphite of soda dissolved therein.

The finger of caution must here point to a warning:
 *Never use this latter tray for any other than a hyposulphite of soda solution.*

Remove the plate from the tray where it lies, handling it by means of the negative clasp, and place it in the fixing solution contained in the second tray. Keep the plate in this solution until all the milky whiteness has disappeared from the back of the plate—this will be noted by raising the plate and examining the lower side. If any white patches remain, replace the plate in the solution. Patches must thus artistically be hidden from view, so allow a little additional time before taking out the plate, to be sure that they have all disappeared. Then take the plate out of the solution, and wash it thoroughly. White light will not now harm it, so it can be carried to a sink outside of the darkened room.

Every particle of hyposulphite of soda should be removed from the film and plate. The washing is done by permitting a gentle stream of water to flow over each side of the plate. Do not permit the fingers to touch the film, as thus the negative would be marred.

After carefully and completely cleansing the plate, rinse out the developing tray and pour it half full of the alum solution, which is mixed according to the formula presented here :

Water, twenty ounces, and all the alum it will take and hold in solution, or, in other words, a "saturated solution."

Place the plate, film side up, into the new bath, and permit it to remain there five minutes, while you cleanse your hands from any adhering soda solution.

For increasing the intensity of the high lights, flow the plate with the Hall's intensifier, leaving it on just long enough to give the film a light brown tint, then wash the plate thoroughly. The Hall's intensifier is highly spoken of by Dr. Eder, as it gives to the negative a superior non-actinic property.

Remove the plate from the tray, wash it for a few seconds, and set it up to dry, which may require a number of hours. Do not use heat to dry the plate, as you would thus melt the film, and so cause the gelatine to run about or off the plate. Then your picture would resemble "Castles in Spain," nothing more defined, everything depending on the power of imagination. I present in Fig. 10 a very convenient receptacle for

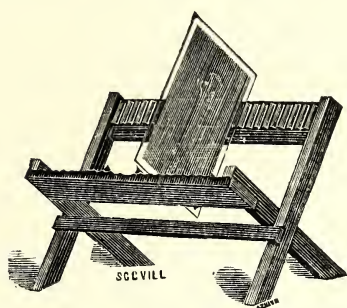


FIG. 10.

holding gelatine plates when drying, which is called a negative rack. Set the plate in this, where it will not be disturbed while drying.

Plate No. 2 can now be put through the course of development and fixing, and into the negative rack. Before doing this, however, that is, handling plate No. 2, empty the tray con-

taining the alum solution back into the bottle, wash the tray out, and carry it into the dark room; also throw away the contents of the developing tumbler, which please rinse out also. If the ruby lantern has been extinguished, relight it, and once more banish all white light from the closet.

All the preceding instructions can be briefly summarized as follows:

1. Put some sensitive plates into dry plate holders.
2. Make the exposures.
3. After taking a plate out of the holder, place it in a tray filled with water.

4. Drain off the water and pour over the plate the mixed developing solution.

5. Wash the plate and place it in the hypo solution.

6. Wash the plate and give it an alum bath.

7. Wash the plate and set it in the rack to dry.

8. When perfectly dry, coat the film over with negative varnish, and allow that coating to dry. After this the surface of the plate may be touched by the fingers.

From this description chemical manipulation may seem complicated, but the processes are really not so. Rather than have the amateur grope along, trying to discover what will bring success, and what will lead to error, I have endeavored to mark out each step to be taken. Still, if the amateur hesitates and wavers, not trusting his own ability to manipulate a plate, he can have the development done by a professional photographer, and also the printing, toning, and mounting of the picture. I do not recommend this. To "go it alone" is the true American way. If doubts arise, consult with some one of experience, and believe in your ability to do what other amateurs have done.



CHAPTER VI.

VARNISHING THE NEGATIVE.

WE left the negative in the rack drying, and it must be thoroughly dried before the next process is attempted. My plan is to leave the negative in the rack over night to dry. It follows next in order that a coating of S. P. C. negative varnish should be put over the film on the negative to preserve

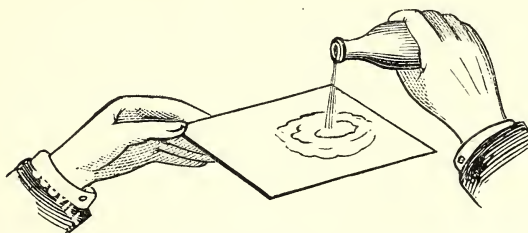


FIG. 11.

and protect it. So warm the plate slightly; do not use much heat—only just sufficient to give the plate an indication of warmth.

Grasp the plate by the corner with the left hand, in the manner shown in Fig. 11. Have the film side up. With the right hand remove the cork from the bottle of varnish, and, taking it up, pour enough on the plate to make a pool, which can be spread over the surface of the plate, but not so much that the varnish will run off at the edge. Fig. 11 illustrates the act of pouring out the varnish. Incline the plate so that the varnish will flow to the upper right hand corner, vary the inclination, and send the varnish to the upper left hand corner, then around to the corner held by the hand, and finally to the lower right hand corner. It will, of course, be surmised that the object of these movements is to coat the

film on the plate over evenly with varnish. When the varnish has reached the lower right hand corner, the bottle should be placed as indicated by Fig. 12, so that it will catch the surplus varnish. Gradually the corner distant from the bottle is

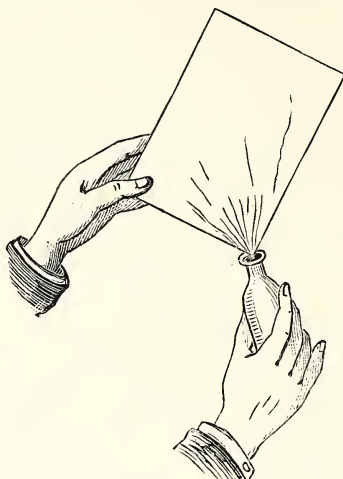


FIG. 12.

raised so that all the excess of varnish will run off the plate, to accelerate which give the plate a slight rocking motion to and fro from right to left.

As soon as the varnish ceases to run off, remove the bottle, cork it, and draw the lower corner of the plate over a bit of paper to wipe off any drops clinging to the edge. Warm the plate to dry the varnish, using only sufficient heat to cause it to dry with glossy brilliancy.

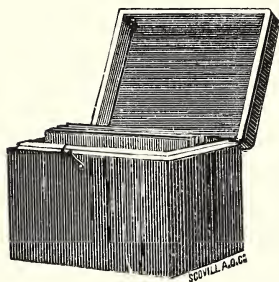


FIG. 13.

Set aside the varnished negative for a few hours to cool and harden, and then it will be ready for the printing frame. When a number of negatives have been developed and varnished, there are two methods of preserving them from the dust and from scratches. One is by putting them in envelopes made of stout paper, and called "negative preservers," which are sold to correspond to differ-

ent sized negatives. Another way is by placing the negatives in boxes like the one shown in Fig. 13. These are called "negative boxes," and are constructed to hold twenty-four negatives, which latter are slipped into the grooves at the two sides, and thus kept from rubbing.



CHAPTER VII.

PRINTING FROM THE NEGATIVE.

OR, in other words, producing from a negative a positive picture on paper. For this purpose are needed two porcelain trays, one printing frame, some ready sensitized paper, a bottle of chloride of gold, a quarter pound acetate of soda, one ounce chloride of lime, one pound hyposulphite of soda. This is a fair proportion of chemicals. Before commencing to print, determine how many pictures you want from each negative, and cut the proper amount of sensitized paper into pieces the size of the negative. There are in each sheet sixteen pieces,

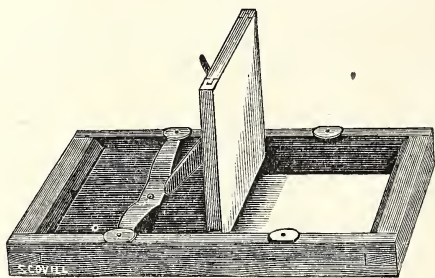


FIG. 14.

four by five inches in size. Use an ivory paper cutter, and do not allow your fingers to touch the sensitive or glossy side of the paper. Put the pieces of sensitive paper in a large envelope, which place in a shallow paper box and conceal in a dry and dark place until wanted for use; or, better still, procure one of the Hallenbeck Sensitized Paper and Dry Plate Safety Boxes. These are provided with lock and key and with an inside lid, weighted to keep the sensitized paper flat. Sensitized paper should be handled only in a weak light.

Fig. 14 is that of a printing frame with one half of the back-board unfastened and opened.

Unfasten the other half and take the whole back-board out. Dust out the inside of the frame, and also dust off the negative. The outside of the frame would not be harmed by the same treatment. Put the negative in the printing frame so that the film side is up, and upon it place a piece of sensitized paper, with its glossy side down. Replace the back-board in the printing frame. Note that the paper underneath is smooth. Fasten the springs by sliding the ends under the buttons on the frame, using gentle pressure to avoid breaking the



S. P. C. OUTFIT FOR PRINTING, TONING, AND MOUNTING PICTURES.

glass negative underneath. The placing of the sensitized paper in the frame must be done in a subdued light. Carry the printing frame, when closed, to the window, place it upon the sill, and let the light fall upon the front of the frame. Occasionally remove the frame from the window, stepping back into the room to examine the print. Loosen one of the springs, raise one half of the back to a perpendicular position, as shown in Fig. 14, bend back the sensitized paper, and see how the printing is getting on. When the print looks darker

than you wish the finished picture to appear, remove it from the frame and place it away from the light in the box before described. Put another piece of sensitized paper in the frame and continue as before, until you have secured the desired number of prints from this negative.

Some negatives may require continuously the full benefit of the sun's rays on the printing frame, but the greater number do better in a more subdued light. Never permit anything to throw a reflection on your frame while printing with it.

When examining the print, always do so in a weak light. Use care in putting in the paper, and do not scratch the negative.



CHAPTER VII.

TONING THE PRINTS, AND FIXING THEM.

ALTHOUGH toning is the next operation, you will naturally prepare the toning and fixing solutions *before proceeding to make the prints*. The formula for preparing the gold stock solution is as follows :

Into seven and one-half ounces of water dissolve fifteen grains chloride of gold and sodium.

Pour clean water into one of the porcelain trays, and into this bath place the prints. Toning should be done in a weak light. Do not get too near a window, but have sufficient light to see distinctly without requiring guess-work. After the prints have soaked awhile in the water, pour it off and renew with fresh. This should be repeated a number of times, and at the last change permit the prints to soak while you prepare the toning bath according to the following formula :

For mixing the toning bath, take of French azotate, one ounce; water, six ounces; gold solution, two ounces. The above bath is quickly made, and is one now used in many galleries and by nearly all amateurs.

The water is now drained off the prints and they are placed in the solution just mixed, face downward, one at a time, pressing them down into it with the fingers. When you have finished this, commence leisurely to turn them over, and the reversal or turning over should continue while they remain in this solution, in order to secure even tones. The prints are presumed to be toned sufficiently, when, on examination by transmitted light, the whites are found to be clear, and by reflected light the pictures have a purple tint. Remove the prints from the toning solution (which preserve for future use), and wash them well in clear water, using the now empty dish for the purpose.

Fixing the Prints.—Pour this water off and place the prints in the fixing bath, which is thus made up :

Hyposulphite of soda, four ounces; common salt, one ounce; sal soda (washing soda), one-half ounce, and water, thirty-two ounces.

Prepare this solution the day before it is to be used, or warm to ninety degrees. Put the prints in the fixing solution to remain twenty minutes. (This should be used but for one lot of prints.) After fixing the prints, wash them thoroughly and well, and then hang them up to dry. As stated before, it is necessary to have all trace of the hyposulphite of soda removed from the prints. This is accomplished by long washing in running water.

To remove quickly from a negative film the last traces of hyposulphite of soda and chemical compounds, derivative of the fixing process, and which after a reasonable amount of washing may still be retained, we resort to chemical actions, decomposing the obnoxious and injurious salts, rendering them into harmless compounds. This is done to perfection with the S. P. C. Flandreau's hypo eliminator, a solution of hypochlorite of zinc, of which one-half ounce is added to two quarts of the last washing water. The negative is allowed to remain for ten minutes in it, is rinsed off with pure water and set on the drying rack.

To test for the presence of hyposulphite of soda in the negative film we employ the iodide of starch paper. A piece of it, when moistened, will turn intensely blue. When applied in this state, either directly to the wet film or the drippings of the wash water, the blue color should remain intact. Bleaching indicates the presence of hypo. The reagent is so extremely sensitive that it will show hypo quite distinctly when in a solution of the proportions 1 : 6000.

In a similar manner as described, the hypo eliminator and the iodide of starch test paper can be used to examine albumen or other prints made with a salt of silver and fixed in hyposulphite of soda.

Blue Prints (Cyanotypes).—There is another method of producing a positive picture on paper, which is very simple. It is called the "*blue process*," and is much used for reproducing

mottoes, drawings, manuscripts, etc. The manipulation is as follows: Place the negative in the printing frame, film side up; upon it lay a piece of ferro-prussiate paper, colored side down. After fastening in the back, carry the printing frame to the window, and turn the front side out to receive the sunlight for from three to ten minutes. Occasionally take in the frame to examine the printing, and as soon as the image is distinctly seen on the paper, place the print in a pan of clear water for from fifteen to thirty minutes, or until the whites of the picture are clear, when you will have a permanent blue print on white paper. This will at least answer for a proof, and show the quality of the negative. The handling of this paper should be done in a very weak light until after it is washed. Lamp or gaslight will not hurt it.



CHAPTER IX.

TRIMMING AND MOUNTING PRINTS.

PRINTS can be trimmed, one at a time, by laying a ruler over them, and cutting along the straight edge with a very sharp knife; but the better method is to use the Scovill glass forms, as the picture can be seen through them, and by shifting the form the best portion of the print may be selected. Lay the print on a thick light of glass, over it adjust the glass form, and with a sharp penknife cut all around the edges. Better than a knife for this purpose is one of the Robinson trimmers, illustrated by Fig. 15, as it makes a clean-cut edge, not a rough or uneven one.



FIG. 15.

Mounting the Prints.—When through trimming the prints, my plan is to dampen a light of glass, at the same time making sure that it is clean. Then I take each print separately, and immerse it in water until it lies flat. (By this time you realize that prints, as well as negatives, must accept the doctrine of total immersion.) Then place it face down upon the light of glass; on top of it put another print facing down, and so continue until all of them have been dampened and thus piled up. Drain off the surplus water so that the prints will not be too wet.

The paste used for mounting must be sweet. Sour paste will spoil your prints. Do not forget this fact, and you will not, after a while, have to lament about the fading and staining of some choice view. *Parlor paste* is the best for an amateur's use, as it keeps well and is always ready for service. It is only essential to see that the bottle or jar containing it is corked (when not in use) to keep out dust. With this paste keep a bristle brush—a two inch brush is best—as a large surface can be spread over with paste in a short time, and it will do the work evenly.

After wetting the brush and squeezing out the water, dip it in the paste, and apply this to the upper surface or back of the top print on the pile, passing the brush backward and forward until an even coating is put on. See that the edges are not neglected. With a knife blade lift one corner of this print, grasp it with the finger and thumb of the left hand, and raise it off the other prints; at the same time take hold of the lower edges and turn it in such a manner that the print will be suspended paste side down between the two hands. Now bring it over to the card-board or mount, and poise it over the middle. Gently lower the center of the print down to the mount, and carefully push one edge, and then the other, down to card-board surface. Place a clean piece of paper on the print, and, commencing at the center, rub with the hand toward one end and then toward the other, to press out all air from beneath the print. If it appears to be smoothly pasted on, lay the mount aside. After you have finished mounting prints, wash off the glass and cleanse the brush.

Set the mounts up separately to dry.

Let me suggest at this point, before I forget it, a handy appliance for mounting, or, in other words, rolling down your prints after they have been pasted. It consists of a round turned stick, over which a piece of rubber tubing has been drawn to cover the surface and to fit tightly. Six inches would be a convenient length for the stick and tubing. Put a three-quarter inch screw in the center of each end of the stick. Bend a piece of stout wire in a half circle, and then

twist the two ends so that the screws will go into the rings thus made as far as their heads. Passing the screw up to the heads, through these two ends, and turning them into the ends of the stick, you will have ready a handy implement for rolling down the prints after they are laid on the mount.

Should the occasion arise when you desire to mount a picture on very thin card-board or on paper, the following special material should be used if you would have the prints, when dry, lay flat and be free from puckers: *Take of Nelson's No. 1 gelatine, four ounces; water, sixteen ounces.* Allow the gelatine to soak in the water for ten minutes, then set the

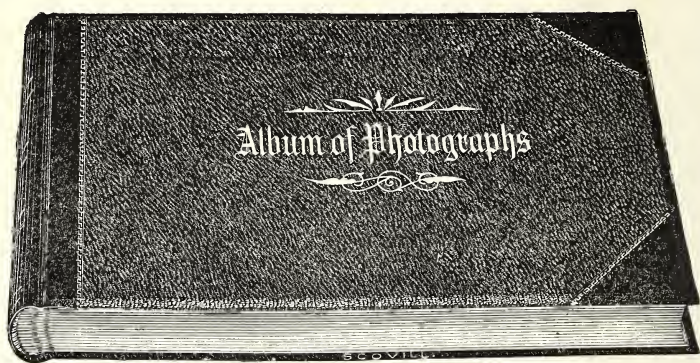


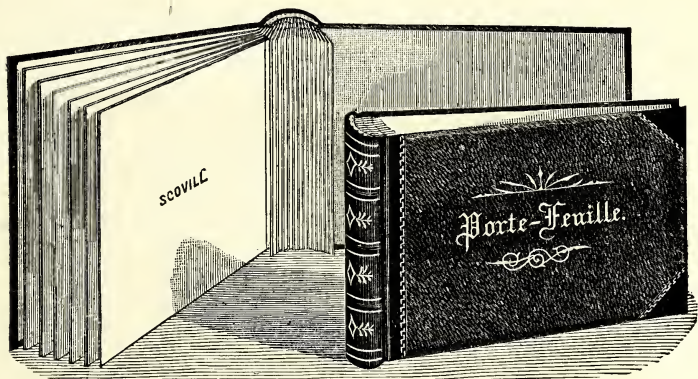
FIG. 16.—ALBUMS FOR PHOTOGRAPHS.

bottle containing the hot water to make the gelatine dissolve, after which add one ounce of glycerine, and then five ounces of alcohol. With the paste thus made there will be no trouble about mounting prints according to the previous directions in this chapter. This paste requires warming (by setting the bottle in hot water) before use. Whether the mounted prints shall be framed or put in a portfolio is left to the taste of the amateur.

How often the amateur photographer is heard to remark that "as fast as he makes prints from a negative, his friends make off with them," and none are left to be treasured as evidence of his advancement in the art. In order to keep at

least one picture from each negative, and to arrange the collection in the best manner for display and preservation, tasteful albums have been introduced by the Scovill Manufacturing Company. (See Fig. 16.)

Each album has forty-eight pages (twenty-four leaves). In them the finest card-board only is used, chemically free from anything that could injure a print. Muslin cloth covers with leather back and corners, finish the albums sufficiently to make them an ornament in a library or on any center table.



THE SCOVILL PORTE-FUEILLE

is a device for the preservation, in convenient form, of cards upon which photographic prints have been mounted.

A series of muslin holders, bound between covers with patent flexible backs, constitute a book having great strength of binding combined with a flexibility that allows the book to be opened flat without strain. Prints can thus be put into book form, readily and securely, *after* they have been mounted, and also (when desired) burnished.

CHAPTER X.

TRANSPARENCIES, MAGIC LANTERN SLIDES, AND ENLARGEMENTS.

How to Make Transparencies.—In the dark room, illuminated by ruby light, place a negative, film side up, in the printing frame; on the surface of the negative lay a gelatine plate of the slow kind, film side down. (For this purpose special plates are prepared and sold.) Put the back in the printing frame, fasten the springs, and cover the frame with the focusing cloth, taking it into a room where a gas or kerosene light is burning. Hold the frame with the negative toward the light, and distant about twelve inches from it. Take off the focusing cloth, give from ten to twenty seconds' exposure, according to the density of the negative; re-cover the printing frame, and go back to the dark room. Use the following developer for the gelatine plate:

No. 1.

<i>Neutral oxalate of potash,</i>	-	-	4 ounces.
<i>Water,</i>	-	-	20 “
<i>Bromide of potassium,</i>	-	-	40 grains.
<i>A saturated solution of oxalic or citric acid</i> <i>(enough to turn blue litmus paper red).</i>			

No. 2.

<i>Sulphate of iron,</i>	-	-	300 grains.
<i>Water,</i>	-	-	3 ounces.

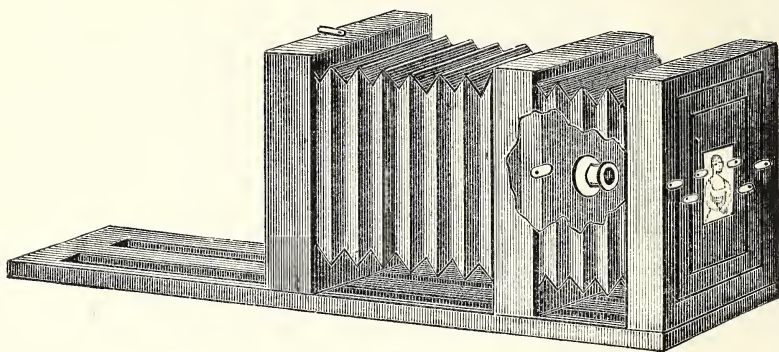
Take of Solution No. 1, seven ounces; and of No. 2 Solution, one ounce. Mix them, and develop until the detail in the highly lighted portion shows quite plainly. The result should be a fine positive picture or transparency, which is fixed, washed and dried, and then is ready to be put in a nickel-plated frame with a ground glass at the back, and hung where the light shines through it—probably to adorn a window.



This illustration is presented with the triple purpose of showing a picture made upon a Carbutt A Plate; also, the glass with etched border, and the drawing-room transparency frame, which give a finish to the picture.

Magic Lantern Slides.—To make these slides, proceed in a similar manner to that just described for making transparencies, observing care, however, not to get the positive too dense, or, in other words, so opaque that light shining through it will not throw out all the details in the picture. In short, the positive should be weak, but its details perfect, in order to make a fine lantern slide.

Many amateurs prefer to use a $3\frac{1}{4} \times 4\frac{1}{4}$ camera—the most convenient for making negatives to copy as lantern slides; where such pictures are quite sharp, it has been found that there is not the least difficulty about enlarging them to 8×10 size, hence the introduction and employment, for enlarging and other purposes, of the Scovill Enlarging, Reducing and Copying Cameras, which are made in the following sizes:



$6\frac{1}{2} \times 8\frac{1}{2}$, 8×10 , 10×12 , 11×14 , and 14×17 . Other sizes may be made if required. The following directions for use will be of service, and as simple as the operation explained:

To copy a negative in the natural size, place it in the kit on the front of camera and button it in. Attached to the center frame of the camera is a division upon which, on the side toward the camera front, a lens is mounted. Suppose this to be a quarter-plate portrait lens, the focal length of which we will suppose to be 4 inches—draw back the center frame and the lens twice the focal length of the lens (8 inches); slide the back frame with ground glass the same distance from the

center frame. To enlarge with the same lens to eight times the size of the original, the center of the lens must be $4\frac{1}{2}$ inches from the negative, and the ground glass be 36 inches from the center of the lens. To reduce in the same proportion, reverse and have 36 inches from the center of the lens to the negative, and from the center of the lens to ground glass $4\frac{1}{2}$ inches.

TABLE FOR ENLARGEMENTS.

Copied from the "British Journal Almanac for 1882."

FOCUS OF LENS.	TIMES OF ENLARGEMENT AND REDUCTION.							
In.	1 In.	2 In.	3 In.	4 In.	5 In.	6 In.	7 In.	8 In.
2	4 4	3 3	$2\frac{3}{4}$ 8	$2\frac{1}{2}$ 10	$2\frac{2}{5}$ 12	$2\frac{1}{3}$ 14	$2\frac{2}{7}$ 16	$2\frac{1}{4}$ 18
$2\frac{1}{2}$	5 5	$7\frac{1}{2}$ $3\frac{3}{4}$	10 $3\frac{1}{3}$	$12\frac{1}{2}$ $3\frac{1}{8}$	15 3	$17\frac{1}{2}$ $2\frac{1}{12}$	20 $2\frac{5}{7}$	$22\frac{1}{2}$ $2\frac{1}{6}$
3	6 6	9 $4\frac{1}{2}$	12 4	15 $3\frac{3}{4}$	18 $3\frac{2}{5}$	21 $3\frac{1}{2}$	24 $3\frac{3}{7}$	27 $3\frac{3}{8}$
$3\frac{1}{2}$	7 7	$10\frac{1}{2}$ $5\frac{1}{4}$	14 $4\frac{2}{3}$	$17\frac{1}{2}$ $4\frac{3}{4}$	21 $4\frac{1}{5}$	$24\frac{1}{2}$ $4\frac{1}{12}$	28 4	$31\frac{1}{2}$ $3\frac{1}{16}$
4	8 8	12 6	16 $5\frac{1}{4}$	20 5	24 $4\frac{2}{5}$	28 $4\frac{2}{8}$	32 $4\frac{4}{7}$	36 $4\frac{1}{2}$
$4\frac{1}{2}$	9 9	$13\frac{1}{2}$ $6\frac{3}{4}$	18 6	$22\frac{1}{2}$ $5\frac{5}{8}$	27 $5\frac{2}{5}$	$31\frac{1}{2}$ $5\frac{1}{4}$	36 $5\frac{1}{7}$	$40\frac{1}{2}$ $5\frac{1}{16}$
5	10 10	15 $7\frac{1}{2}$	20 $6\frac{2}{3}$	25 $6\frac{1}{4}$	30 6	35 $5\frac{5}{6}$	40 $5\frac{5}{7}$	45 $5\frac{5}{8}$
$5\frac{1}{2}$	11 11	$16\frac{1}{2}$ $8\frac{1}{4}$	22 $7\frac{1}{8}$	$27\frac{1}{2}$ $6\frac{7}{8}$	33 $6\frac{1}{2}$	$38\frac{1}{2}$ $6\frac{1}{12}$	44 $6\frac{2}{7}$	$49\frac{1}{2}$ $6\frac{3}{16}$
6	12 12	18 9	24 8	30 $7\frac{1}{2}$	36 $7\frac{1}{6}$	42 7	48 $6\frac{6}{7}$	54 $6\frac{3}{4}$
7	14 14	21 $10\frac{1}{2}$	28 $9\frac{1}{3}$	35 $8\frac{3}{4}$	42 $8\frac{2}{5}$	49 $8\frac{1}{6}$	56 8	63 $7\frac{3}{8}$
8	16 16	24 12	32 $10\frac{2}{3}$	40 10	48 $9\frac{3}{5}$	56 $9\frac{1}{8}$	64 $9\frac{1}{7}$	72 9
9	18 18	27 $13\frac{1}{2}$	36 12	45 $11\frac{1}{4}$	54 $10\frac{3}{5}$	63 $10\frac{1}{2}$	72 $10\frac{2}{7}$	81 $10\frac{1}{4}$

It is assumed that the photographer knows exactly what the focus of his lens is, and that he is able to measure accurately

from its optical center. The use of the table will be seen from the following illustration: A photographer has a *carte* to enlarge to four times its size, and the lens he intends employing is one of six inches equivalent focus. He must, therefore, look for 4 on the upper horizontal line, and for 6 in the vertical column, and carry his eye to where these two join, which will be at 30— $7\frac{1}{2}$. The greater of these is the distance the sensitive plate must be from the center of the lens, and the lesser, the distance of the picture to be copied. To *reduce* a picture any given number of times, the same method must be followed; but in this case the greater number will represent the distance between the lens and the picture to be copied—the latter, that between the lens and the sensitive plate. This explanation will be sufficient for every case of enlargement or reduction.

If the focus of the lens be twelve inches, as this number is not in the column of focal lengths, look out for 6 in this column and multiply by 2; and so on with any other numbers

CHAPTER XI.

INSTANTANEOUS PHOTOGRAPHY.

CONSIDERABLE is heard about instantaneous photography at the present time. It is a subject that interests every one. When made practicable, the photographer eagerly seized hold of the lightning process, applied it in taking the pictures of restless children.

It is enough to lure any one into amateur photography, the very thought of picturing animated objects distinctly, with all the appearance of motion instantly arrested.

The amateur may infer that the appliances for securing instantaneous pictures are very complicated. Not at all? It is necessary to use gelatine plates of great sensitiveness. These are regularly kept on hand by dealers in photographic goods. The second requisite is that the lens used on the camera should be provided with a drop, or else that instantaneous shutters be fitted on to the lens or camera. The day chosen for taking the picture should be a bright one, and the time between 10 A.M. and 2 P.M. is much to be preferred. See that the object to be photographed is brightly illuminated on the side toward the camera.

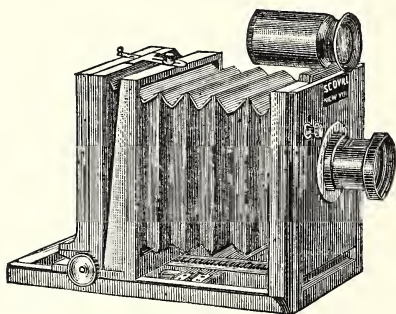
Suppose a passing steamboat first calls into use the instantaneous drop on a lens you possess. Your ambition is suddenly awakened when the boat looms up in the distance, and you plant the tripod and point the camera toward where it will soon pass. Judge how far it will be away from you as it glides by, and obtain an approximate focus for this distance.

If possible, focus upon an object as remote as the steamboat will be in passing the point where the picture is to be taken. Secure the focus by this method, or by using your own judgment. If the drop is not already in the lens put it in, and

hold it up by a turn of the button underneath the lens. Substitute a holder for the ground glass.

As the steamboat is now near at hand, draw out the dark slide separating the sensitive plate from the camera, and lay it on top of the latter. Stand behind the camera, grasping the cord attached to the button holding up the instantaneous drop.

Keep cool as an old hunter, look over the top of the camera, and when the boat arrives at a point directly in the line that the lens points to, pull the cord. As the opening in the drop passes through the lens the light flashes through the aperture to the gelatine plate, and the image is impressed there. Is there any other demonstration needed of the rapidity with which light travels? The amateur may have been nervous, and have pulled the cord too soon. Instead of the whole steamboat, he finds but the forward half of it when the picture is brought out; or, on the other hand, only the stern and the wake of the boat may be caught. Hence it is well to have and use a Waterbury Adjustable Finder for instantaneous photography.



Sport, like shooting at birds in their flight, cannot be more exciting and exhilarating. If the amateur "shoots" at a steamboat with his camera and hits a barge, he will succeed better upon the next trial. The fall of the instantaneous drop by the law of gravitation, will do for the first attempt. After a time the amateur will scheme and contrive, by the use of an elastic band over the top of the drop or by some other device,

to shorten the exposure. The ambition to reduce the time from one-tenth to one-thousandth part of a second and less, is similar to that of turfmen in striving to have their racers excel all previous records of time.

"Shooting" yachts that are dashing along through the waves under full sail is a favorite accomplishment of the full-fledged amateur. The beauty and life of the yacht may be portrayed perfectly.

Many amateurs have stated that the pleasure of picture taking was never fully realized until they procured one of the Scovill Detective Cameras. I make mention of this one because there is nothing to betray the presence of a lightning lens and perfectly regulated shutter, nothing in the shape of external mechanism to call attention to its purpose.

The only cautions I have to give are, do not attempt too much at first in instantaneous work; and the other piece of advice relates to the development of gelatine plates exposed but for a fractional part of a second. More care is needed than for the ordinary plates. My plan is to mix a fresh developer for each plate, consisting of two ounces of oxalate of potash solution and a quarter of an ounce of the iron solution. Should this prove too weak, more iron solution may be added, but do not put in too much. When the details are brought out, pour off the developer, and flow over the plate some of the old oxalate developer. This will give density without danger of fogging the plate. Wash and fix, then wash and dry. After the negative is dry, if on examination it requires to be strengthened, proceed as follows: Lay the plate, film side up, in a tray containing clear water, while you mix the intensifying solution. In thirty-two ounces of water (one quart), dissolve one ounce of chloride of ammonia and one ounce of chloride of mercury. Pour off the water from the plate and cover it with some of the above mercury solution diluted one-half with water (that is, an equal part of the solution and water). Leave this on the plate until it has uniformly whitened, which will take but a few seconds, then

pour it off and wash the plate well. Also rinse out the tray, into which replace the plate film side up.

Take four ounces of water, and to it add one dram of liquid ammonia. Pour this on the plate so it flows quickly and evenly over it. The negative will turn dark brown. As soon as it has done so, remove it from the tray, wash, and set it up to dry.

Throw away the ammonia solution, and wash out the tray.

Developing solutions for instantaneous exposures, to be used when a more energetic developer than the ferrous oxalate is necessary:

P.—Citric acid,	-	-	-	-	60 grains
Water,	-	-	-	-	7 ounces.

Dissolve, and add

Pyrogallie acid,	-	-	-	1 ounce
Water sufficient to make measure,	-	-	-	10 ounces.
A.—Liquor ammonia,	-	-	-	2 ounces
Water,	-	-	-	8 ounces.
B.—Bromide of ammonium or potassium,	-	-	-	1 ounce
Water, to make	-	-	-	10 ounces.

DEVELOPMENT.—Add one ounce of solution P to thirteen ounces water; one ounce solution A and one ounce solution B to twelve ounces water. Mix equal parts of each for developing. Two ounces of each will be ample for a 5x8 or 6½x8½ plate, to be mixed just before laying plate in the developing dish. Flow the developer by a gentle motion over the plate. The image soon appears and, if correctly exposed, will attain full density in sixty to ninety seconds. Allow development to proceed till the detail in the deepest shadows is well brought out.

CHAPTER XII.

PHOTOGRAPHY WITH THE MICROSCOPE.

THE microscopist needs a convenient method to enable him to easily and correctly reproduce the result of his observations. Granted that this is now practicable, it follows that greater interest in microscopy itself must be awakened, and pathological, entomological, and many branches of study and research be wonderfully aided by the use of a photo-microscopic camera. As I am in microscopy but a novice, though with growing interest, I will quote what is said on this subject in the *Photographic Times and American Photographer* :

Photographing with the microscope has hitherto been accomplished by the aid of elaborate and costly apparatus, and been applied chiefly to making illustrations for scientific magazines. The process used, that of wet collodion in connection with sunlight, involved the procurement of an expensive heliostat to produce a steady illumination, for with any less powerful light the exposure would necessarily be so prolonged that the coating of the plate would dry and become useless. Now all this is changed, for with the modern improvements in photography, which are the result of the introduction of gelatine dry plates, the photographing of microscopic objects becomes as easy of accomplishment as the photographing of the beautiful and visible in nature, is with the popular amateur outfits. I therefore propose briefly, yet fully, to describe how it can be done by means of an inexpensive outfit. The scientist and microscopist, instead of spending hours in making imperfect drawings, aided by the camera lucida, may in a few minutes, with the assistance of photography, produce a more perfect representation of a minute object than it is possible for the hand of man to do, working conjointly with the eye. Not only can an enlarged image of a microscopic object be formed for illustration, but professors in colleges will find it a ready means to produce negatives of a suitable size from which may be made

transparencies or magic lantern slides for exhibition to classes or the public.

The necessary requisites for those in possession of a microscope are a suitable artificial light, a half-plate camera made for this purpose, gelatine dry plates, and chemicals for development.

The Scovill Manufacturing Company have, with their usual promptness to meet any new and real want in the art-science of photography, constructed a suitable camera of a size to use what are known as the half and quarter plates. The writer has devised and patented a lantern for dry plate use, which by the addition of a condenser furnishes a light for use with the microscope, and its convenience is such that when arranged

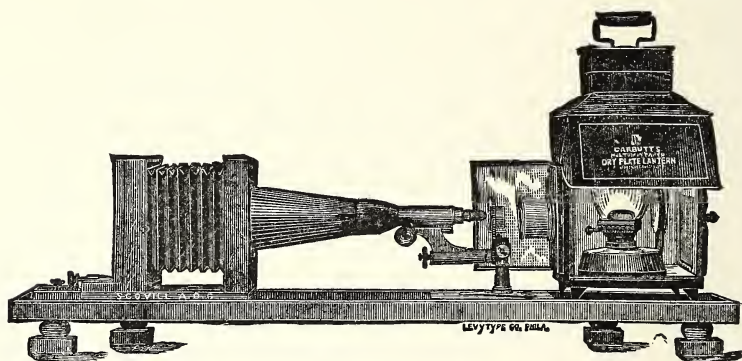


FIG. 17.

with the microscope and camera (as shown in Fig. 17) it furnishes a clear, strong light for photographing, and then a red or non-actinic light for developing the exposed plates, without any change but a half reversal of the lantern. If made use of in the daytime, a room from which all white light is excluded should be selected; but if used at night, as in most cases it would be, the operations may all be performed in the midst of a family group for their interest and amusement, and to impart to them knowledge of the minute life or organisms of the world which the microscope alone can reveal.

Having provided yourself with a photomicroscopic equipment, consisting of a Multum in Parvo lantern and condenser, a Scovill half-plate camera, some Keystone B plates, $4\frac{1}{4} \times 5\frac{1}{2}$ size, to make negatives, also some A plates, $3\frac{1}{4} \times 4\frac{1}{4}$ size, for transparencies, and the necessary chemicals, proceed to set up

the apparatus. First, procure a board one inch thick, about four feet in length and a trifle wider than the camera. Screw battens on the under side in order to keep the upper surface flat and free from warping, tack on the sides a thin strip of wood, allowing it to project half an inch above the surface, so that camera, microscope and lantern can all be kept in line. To be successful, it will be necessary in arranging the apparatus for the first time to do so with care, so that it can at any future time be put in position without a waste of time. Place the baseboard on any flat surface—a table or bench—make four wooden wedges, place them under the sides near the end, and with a spirit level proceed to level the surface both in its width and length. Now, on the left-hand end of the board place the camera; in the middle of the board place the microscope, with the tube set horizontally; see if the eye-piece centers with the center of the camera. If it does not and is lower, place a thin board under the microscope or raise it till its center corresponds to the center of the camera, and then proceed to test the tube of the microscope by placing the level on it in the direction of its length; if not level it must be made so by any suitable means that can be applied to it. If the microscope is found to center with the camera as it rests on the baseboard, a ready means of placing it in position at any future time is to mark exactly where it stands and thus save future calculations. Adjust the lantern so that the diaphragm of the condenser centers with and is in line with the objective of the microscope, then, finally, by connecting the tube of the microscope with the cone of the camera, at the end of which is a sleeve of rubber cloth, the apparatus is ready for use.

I have somewhat minutely described the first arrangement of the various parts, because neglect of a proper adjustment at the beginning might result in failure. When arranged as described, and the position of each marked for future guidance, these parts are easily and quickly put together at any future time, and the baseboard can be placed on any convenient support. I use and recommend as guards against jarring, four hard rubber balls placed in the sunken center of four small blocks of wood, as shown in Fig. 17.

Now, all being ready, light the lamp, after filling the reservoir not more than two-thirds full with good head light oil; trim the wick square on the top, let it burn a few minutes, then adjust the wick for a bright but not too high flame. Turn the lamp by the button underneath so that the re-

flector throws the light through the door without the porcelain screen at the left side of the lantern; then unscrew the burner a little and turn it so that a perspective view of the flame is presented to the eye when on a line with the camera and microscope; adjust the reflector so that the center of reflection coincides with the center of the white part of the flame (this can be done by temporarily removing the sliding back of lantern); then place in position the condenser by slipping the frame under the upper metal strip in the left-hand opening and bending the lower metal strip against it. Put the object to be photographed on the stage of the microscope; first see that a sharp disc of light is formed on the ground glass of the camera; it may require, and most likely will, a forward or lateral adjustment of the lantern with its condenser to get the best light effect, and when this is obtained mark on the baseboard for future guidance. Proceed to arrange the size of the picture by looking at the image on the ground glass and focus with the coarse adjustment, first removing the eye-piece.

After having got the image of suitable size, I advise the following mode of final focusing: Take a piece of clear flat glass of the same size as the gelatine plate, place this in the holder with the back and slide taken out, and with a magnifier adjusted to the surface of the glass, proceed to focus with this fine adjustment; then, by ruby light, replace the plain glass by a sensitive gelatine plate—of course replacing the slide and back—place it on the camera, and with a piece of card, temporarily cut off the light; withdraw the slide and allow the light to act for 45, 90 or 120 seconds, according to the object and amount of amplification. One or two trials is the only way of arriving at a correct judgment of the requisite exposure. With a one to three inch microscopic objective I have found the time to average as above quoted, and that the color of the object influences this greatly, one strong in color—such as most insect specimens—requiring from sixty to ninety seconds, using a one to two inch double system objective. The exposure being made, the development and finishing of the negative is conducted as described in the preceding chapters of this book.

Many thanks are due to my good friend Mr. Carbutt for his kindly suggestions, as they hastened the completion of an equipment which in my sincere belief, answers a long felt want, and will aid materially in scientific investigation with the microscope, bring the results before the eyes and to the understanding of a far greater number than ever before, and indeed develop another and new form of social or home entertainment.

CHAPER XIII.

STEREOSCOPIC PICTURES.

How to Make and Mount Them.—The camera used to make stereoscopic pictures should take a 5x8-inch plate in the holder, have an upright division through the center, and upon the front board a pair of matched view lenses screwed into the flanges. Such are the requisites for this special service. Make sure that the central partition, called a stereo. division, is fastened in place.

Some discernment is needed in selecting the subject for a stereoscopic view. If the camera points to a distant hillside, and there is no near object included in the range, the view will appear flat when seen through the stereoscope, and will not seem to stand out from the mount. There should be included in the image reflected on the ground glass a near as well as the more remote view. Some shrubbery, the stump of a tree, or any distant and still object will answer. Stereo. pictures made upon this principle, have the most seeming actuality about them. If the two pictures seen upon the ground glass are exactly alike, it is a proof that the lenses in use are well matched. After focusing, put the plate holder up in place of the ground glass.

As it is essential to success that the exposure of the two lenses should be made at the same time, place the focusing cloth on top of the camera, falling over to cover the lenses, and keep the cloth tightly drawn over them. Pull out the dark slide and, as usual, lay it on top of the camera. Now, all is in readiness. Raise the focusing cloth quickly. Do this so that light will enter the apertures in the lenses simultaneously. After a proper length of exposure, drop the focusing cloth over the lenses and replace the dark slide. Follow directions

in Chapter IV. for the development of the plate, but use care not to get one side of it more intense than the other; in short, the negative should be treated the same as any other, until it is ready to be printed from. Take a piece of ground glass, a trifle larger than the stereo. negative, and upon it draw with a

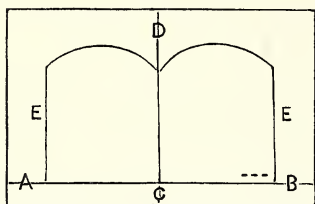


FIG. 18.

lead pencil the diagram shown in figure 18.

The distance between each of the lines *E* and the perpendicular *D C* should be $3\frac{1}{8}$ inches, and from the base line to the crown of both arches, $3\frac{7}{8}$ inches.

These proportions make the very desirable size of stereo. pictures commonly called the "*artistic*."

Lay the negative, film side up, upon the marked ground glass so that the right-hand half will come over the right-hand form penciled thereon, and *vice versa*. Take in the best portion of the subject. With care move the negative so that the line *A B* will pass through similar objects in both halves: also adjust the negative to have the perpendicular *C D* pass through defined lines or objects in the right half. With a sharp-pointed instrument scratch on the negative, using a straight-edged ruler, the line *A B* also the line *E*. Shift the negative so that the perpendicular *C D* will intersect points or objects corresponding to those in the other half. At the same time the scratched base line must coincide with, or be directly above, the line *A B* on the ground glass. Now, scratch the left-hand line *E*, and the negative will be ready for printing.

All of the prints made will show a black base line, and the two outside ones *E E*. Turn the prints face downward, and upon the back of the right-hand half mark with a pencil the letter *L*, and on the left-hand picture the letter *R*. Now, reverse the prints to have the face upward. It is to be hoped that you have available a glass form $3\frac{1}{8}$ inches wide by $3\frac{7}{8}$ inches high, with an arch top. Set down this form upon each print alternately, so that the lower edge will be on the line *A*

B, and one side on one of the lines *E*. With a sharp knife or a *Robinson Trimmer* cut closely around the form. The Robinson Trimmer is suggested because it is so desirable that it has the commendation of photographers everywhere. Always cut the prints on a light of glass.

In mounting the prints on the card, put the one marked *L* on the left-hand side, and the one marked *R* on the right side, and have the two edges meet in the center of the card; also, have an equal margin above and below the pictures. If you can avail yourself of a printing press or hand stamp with movable type, and choose to do so, you can print on fine tissue paper the name of the picture or locality of the view. In printing from the negative, this piece of tissue paper is laid on the face of the negative in one corner, so that the lettering will copy on to the print in the place shown by dotted lines on Fig. 18. Thin tissue or onion-skin paper will not prevent the printing of any part of the negative—the effect is to make the operation a slower one.

The instruction contained in this chapter will be pronounced quite elementary by men of experience. The reasons why have not been given, but enough is stated to enable the amateur to secure good results.

Indeed, the same is true of all that precedes, and I do not imagine that any one will think that he has mastered all there is in photography after fortifying by experience the teachings of this book.

The purpose is to enable the amateur to meet with success, and to furnish a stepping stone by which books more technical and profound will be made intelligible and interesting to the non-professional photographer. Very few, I think, will be satisfied with the rudiments of *this truly fascinating art*.

CHAPTER XIV.

USEFUL INFORMATION.

IN summer keep your solutions cool; also use cold water in washing the gelatine plates.

In winter keep your solutions from freezing.

Should crystallization appear on a negative after it is dry, it shows a failure to thoroughly wash the negative before drying.

Do not use the fixing pan for any other purpose than to hold the hypo solution. Label the pan "*Hypo*," so that there will be no mistake.

Always wash your hands after using the hyposulphite of soda solution, and before handling another plate.

After removal from the fixing solution, the negative must have the hyposulphite of soda thoroughly washed out of the film. *This is important.*

All trays and measures should be washed out after developing each plate.

Never fail to pour clear water over the plate before developing. If you follow this direction, disagreeable markings, resulting from a stoppage in the flow of the developer, will be avoided, and at the same time air bubbles, which cause transparent spots in the negative, will be prevented.

A plate varnished before it is thoroughly dry has a milky appearance.

Keep sensitized plates in a cool, dry place; dampness causes them to mildew.

Clear negatives cannot be produced with an alkaline sample of oxalate of potash.

Bromide in the developer restrains its action, but too much destroys details in the shadows.

If negatives show too much contrast between the light and the dark portions, weaken the developer by the addition of water.

By taking an extra ground glass when going far away from a base of supplies, should the one in use get broken, the second one will be a welcome substitute.

Under-exposure gives clear shadows, but the picture produced from the negative is wanting in detail, and has a hard appearance.

Dust off the surface of gelatine plates with a soft camel's-hair brush. The so-called pin holes in the negative are caused by dust. In this connection it will be well to add, keep the camera, lens and holder well dusted out, for no evil effect will result from it. Quite the reverse.

Plates sometimes commence to pucker at the edge. This is called "*frilling*." Should it show itself at any stage of the manipulation, immediately remove the recalcitrant plate and flow over its surface a saturated solution of alum, wash the plate, and proceed from the point where you left off. A strong solution of hyposulphite of soda often causes frilling; so do warm solutions, and treating the negative with a weak solution of acids.

To prevent plates frilling which show a tendency to do so, take a camel-hair or sable pencil and dip it into your S. P. C. negative varnish. Then carefully go round the edges of the plate, just allowing the brush to touch the film; then set it up to dry, which will not take a minute. This can be done before or after exposing the plates, as may be preferred.

Over-exposed plates, if not properly controlled in the developing, have a thin appearance, and they will make weak prints.

If the edge of the plates, which were protected by the grooves in the holder, remain clear, then fogging comes from lack of care in developing.

When a plate is under-exposed its shadows are clear but weak.

Negatives which require a long time to fix, show one of two

things: either the hyposulphite of soda solution is too strong or too weak. About one ounce of the soda to six ounces of water is a safe rule to go by in making this solution.

Negatives from which a number of prints are required must be varnished, or otherwise they will turn red from a combination of the free silver in the sensitized paper with the gelatine film of the negative. Exposed plates may be kept some weeks before developing, but the better plan is to do this as soon as possible after taking the view.

Should a plate by accident be exposed to light, it may possibly be recovered for service in the following manner: In two ounces of water dissolve twenty grains bichromate of potash. Into this solution lay the light-struck plate for five minutes—*of course, this is done in the dark room.* At the expiration of the time, it is taken out of the solution and washed in several changes of fresh water, and set up to dry by ruby light. When dry, the plate is ready to be placed in a plate holder and exposed. If not to be used, pack the plate away where concealed from light.

When a plate is exposed in the camera, and you are certain that the result is not good, as, for instance, in taking a group of which one or more of the figures moved, put the plate through the mild course of treatment just described, and it may be rejuvenated for use a second time, with a more successful result.

Mistakes in timing an exposure are many. The professional photographer may err. If the calculation cannot be made with certainty, have the error on the side of over rather than under-exposure, as the former can be controlled in the development.

To Reduce the Density of a Negative.—Make first a saturated solution of red prussiate of potash, and, secondly, dissolve one ounce of hyposulphite of soda in ten ounces of water. Add to the second solution as much of the first as to give it the color of dark sherry wine. Flow this compound over the whole plate, watching its action carefully. The reduction of the negative deposit will take place imme-

diately and progress slowly but steadily, but should not be carried on any beyond a point somewhat higher than the one wanted. As the reducing agent has penetrated the film, a sudden interruption of the process will not stop its action at once, but will be continued for some time afterwards, and in order not to endanger the negative a thorough washing in pure water is requisite. The stronger the solution the more forcible its action. If only a slight reduction is needed the solution must be prepared accordingly. For local reduction the compound may be mixed with gum arabic mucilage, and applied carefully with a camel's-hair brush, the addition of gum preventing the flowing of the solution over the outlines of those parts. If properly manipulated excellent effects can be obtained.

Density in a negative may be increased in this way: After the detail is brought out with the oxalate developer you are using, pour it off and flow over the plate the old oxalate developer mentioned on page 00, containing three grains to the ounce of bromide of potassium. If after this treatment you still lack the density you require, fix the plate in a solution made up as follows: Dissolve one ounce of protosulphate of iron in three ounces of water. In another bottle dissolve one ounce of hyposulphite of soda in three ounces of water. Mix the two solutions in a tray, permit them to stand a while, and then immerse the negative in the mingled solutions. After fixing, wash and dry the negative.

Fogging.—Fogging, as defined by Lake Price, “is an opaque film covering a negative, which obliterates the forms, preventing them from being clearly distinguished in whatever direction they may be viewed.” Thomas Sutton writes thus concerning it: “When a precipitate is thrown over the entire plate by the action of the developer, so as to obscure in the deepest shadows the transparency of the glass when looked through, it is fog.” The causes of fog are many. It may result from white light falling on the sensitive plate.

Another cause is defective development.

Another, hyposulphite of soda getting in the developer.

Or chemicals put on the plate from the hands, which were not washed.

Or trying to force the development of an under-exposed plate.

Not properly modifying the developer for an over-exposed plate.

Using an alkaline sample of oxalate of potash.

Or exposing plates in an old holder having free silver about it.

When troubled with fog, examine the gelatine plate, and if the edges which were protected by the rabbeted edge of the holder are clear, the fault is chargeable to the development, as the plate was evidently over-exposed and the developer not modified to meet the case. If the fog is all over the plate, it may have come from white lights, from an alkaline oxalate, from under-exposure, and forcing the development.

WEIGHTS AND MEASURES.

APOTHECARIES' WEIGHT.

SOLID MEASURE.

20 Grains	=	1 Scruple	=	℥
3 Scruples	=	1 Dram	=	ʒ
8 Drams	=	1 Ounce	=	℥
12 Ounces	=	1 Pound	=	lb.

FLUID.

60 Minims	=	1 Fluid Dram	℥
8 Drams	=	1 Ounce	ʒ
20 Ounces	=	1 Pint.	
8 Pints	=	1 Gallon.	

The above weights are those usually adopted in formulas and are what are used in the foregoing chapters. Many other useful tables are given in the "American Annual of Photography and Photographic Times Almanac," and this book will be found very conveniently arranged for reference. As the

amateur advances in the picture-making art, he will, without doubt, read up in photographic literature, a course which cannot be too highly commended.

He will also be inclined to experiment a little. It is an undisputed fact that to the amateur photography owes fully as much for progress and inventive skill as to the professional photographer.

Photography in England is indebted, during many years past, for improvements and discoveries almost wholly to the amateur's researches and experiments.

In trying different formulas, many of which are written by the French standard of weights and measures, the following table will save a considerable amount of figuring, bother, and failure.

* **French Fluid Measures.**—The cubic centimeter, usually represented by "c.c.," is the unit of the French measurement for liquids. It contains nearly seventeen minims of water; in reality it contains 16.896 minims. The weight of this quantity of water is one gramme. Hence it will be seen that the cubic centimeter and the gramme bear to each other the same relation as our drams for solids and the drams for fluids, or as the minim and the grain. The following table will prove to be sufficiently accurate for photographic purposes:

1 cubic centimeter	=	17 minims (as near as possible).			
2 cubic centimeters	=	34	"		
3	"	=	51	"	
4	"	=	68	"	or 1 dram 8 minims.
5	"	=	85	"	" 1 " 25 "
6	"	=	102	"	" 1 " 42 "
7	"	=	119	"	" 1 " 59 "
8	"	=	136	"	" 2 drams 16 "
9	"	=	153	"	" 2 " 33 "
10	"	=	170	"	" 2 " 50 "
20	"	=	340	"	" 5 " 40 "
30	"	=	510	"	" 1 ounce 0 dram 30 minims
40	"	=	680	"	" 1 " 3 drams 20 "
50	"	=	850	"	" 1 " 6 " 10 "
60	"	=	1020	"	" 2 ounces 1 " 0 "
70	"	=	1190	"	" 2 " 3 " 50 "
80	"	=	1360	"	" 2 " 6 " 40 "
90	"	=	1530	"	" 3 " 1 " 30 "
100	"	=	1700	"	" 3 " 4 " 20 "

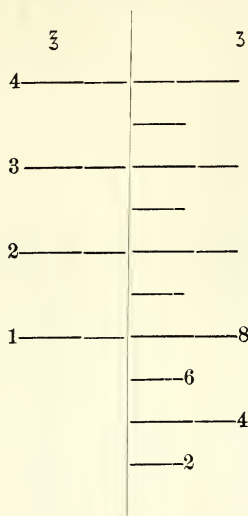
The Conversion of French into English Weight.

—Although a gramme is equal to 15.4346 grains, the decimal is one which can never be used by photographers; hence, in the following table it is assumed to be $15\frac{2}{5}$ grains, which is the nearest approach that can be made to *practical* accuracy:

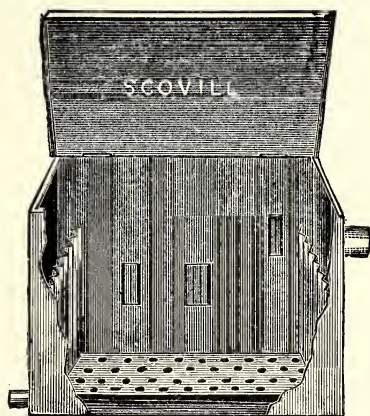
1 gramme	=	$15\frac{2}{5}$	grains.				
2 grammes	=	$30\frac{4}{5}$	"				
3 "	=	$46\frac{1}{5}$	"				
4 "	=	$61\frac{3}{5}$	"	or	1 drachm	$1\frac{3}{5}$	grain.
5 "	=	77	"	"	1 "	17	grains.
6 "	=	$92\frac{2}{5}$	"	"	1 "	$32\frac{2}{5}$	"
7 "	=	$107\frac{4}{5}$	"	"	1 "	$47\frac{4}{5}$	"
8 "	=	$123\frac{1}{5}$	"	"	2 drachms	3	"
9 "	=	$138\frac{3}{5}$	"	"	2 "	$18\frac{3}{5}$	"
10 "	=	154	"	"	2 "	34	"
11 "	=	$169\frac{2}{5}$	"	"	2 "	$49\frac{2}{5}$	"
12 "	=	$184\frac{4}{5}$	"	"	3 "	$4\frac{4}{5}$	"
13 "	=	200	"	"	3 "	20	"
14 "	=	$215\frac{1}{5}$	"	"	3 "	$35\frac{1}{5}$	"
15 "	=	231	"	"	3 "	51	"
16 "	=	$246\frac{3}{5}$	"	"	4 "	$6\frac{3}{5}$	"
17 "	=	261	"	"	4 "	21	"
18 "	=	$277\frac{1}{5}$	"	"	4 "	$37\frac{1}{5}$	"
19 "	=	$292\frac{3}{5}$	"	"	4 "	$52\frac{3}{5}$	"
20 "	=	308	"	"	5 "	8	"
30 "	=	462	"	"	7 "	42	"
40 "	=	616	"	"	10 "	16	"
50 "	=	770	"	"	12 "	50	"
60 "	=	924	"	"	15 "	24	"
70 "	=	1078	"	"	17 "	58	"
80 "	=	1232	"	"	20 "	32	"
90 "	=	1386	"	"	23 "	6	"
100 "	=	1540	"	"	25 "	40	"

Measuring with a Glass Graduate.—On the graduated glass you will find lines and figures, as shown by the diagram on next page. The figures 1, 2, 3 and 4 on the left hand of the centre line represent ounces, and so also does the mark $\frac{3}{4}$ designate the same. The short lines between the ounce lines, 1, 2, 3, 4, represent half ounces. On the lower right hand side of the centre line you will find the figures 2, 4, 6, 8. These represent drams; and the mark or character $\frac{3}{4}$ is used to denote drams. Example: To measure two ounces and six drams, fill the graduate to the line with figure 2 at left hand side, pour this out into the vessel designed for the solution, then fill the graduate to the line with figure 6 on

the right hand side; this is six drams. Add this to the two ounces just measured, which gives you two ounces and six drams.

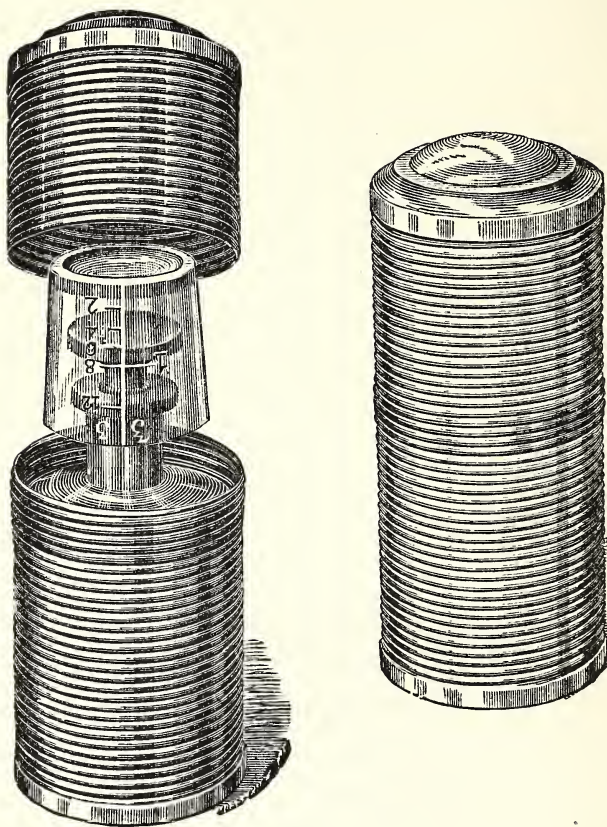


The Scovill Negative Washing Boxes are an aid and convenience in removing all traces of hyposulphite of soda from a negative.



Developers and chemicals in solution may be transported safely in corrugated protecting cases. These are supplied with

cut glass bottles, and graduated tumbler to measure liquids. Though made of thin metal, the corrugation makes them so strong as to resist crushing. Being nickeled and finely finished,



the external appearance of these cases is decidedly tasteful; indeed, one would be more inclined to place them in a satchel than in a packing case. Whether carried about in a horizontal or vertical position, the locking ring affords perfect protection for the liquids contained in the bottle.

CHAPTER XV.

ORTHOCHROMATIC METHODS.

It has ever been claimed for photographic reproductions to be truthful mirrors of the original, whether they be portraits, landscapes or copies from an inanimate object; and justly so as long as we consider form only. In one respect, however, photographic pictures are almost entirely devoid of veracity; that is, in the reproduction of color. Scarlet and yellow, which appear bright to the eye, are represented in a dark, sombre tone, and blue or violet, no matter how dark in the original, are, in the photograph, quite light, at times even white.

Light, divided into its spectrum rays, and then projected upon a sensitive photographic film, will not act according to its color brightness, or as the eye is impressed, but in proportion to a certain force or power called actinism. The chief action will take place in the spectrum region from violet to blue, and those parts containing the bright colors, green, yellow, orange and red, will scarcely be acted upon, showing that the visible effect is not at all a representation of the chemical or actinic force. The term photography is, therefore, not absolutely correct, for light in its entirety does not write or draw, but a portion of it only, the chemically active or actinic rays.

To overcome this seemingly insufficient action of light, methods have been devised to absorb certain rays, and make them active. Among other means proposed to accomplish this, transparent colored glass screens were found to give better results. These screens have been retained to a great extent, not as the sole factor, but in combination with appropriately colored films.

With these methods, called orthochromatic, because colors were more correctly reproduced, as to their brightness or tone value, a powerful assistance was given, when photographing highly-colored objects, like paintings in oil or aquarell colors, chromo-lithographs, fabrics, or embroideries. Equally so for flowers of light yellow or orange, the dark purple of the hya-

cynth, the crimson tulip or the many-colored dahlia, with foliage of various green tone. For interiors with variegated draperies, landscapes clad in autumnal foliage, or sunsets with heavily illuminated clouds, and even for portraits and theatrical groups, costumed in brilliant garments, effects are possible, which can never be reached with a plain iodide or bromide of silver plate of any description.

The preparation of orthochromatic plates has been very much simplified, since the mode of color sensitizing the body of the bromide of silver gelatine emulsion has been abandoned and has been substituted by staining with color a ready-coated plate. A piece of work easily done within a few minutes.

A great facility is thus given to the operator, who when called upon occasionally only, to make pictures with orthochromatic effects, can always be prepared to render color sensitive as many or rather as few plates as the present demands, and without necessitating the purchasing of a whole package or a dozen of orthochromatic plates colored in the emulsion. Several highly important points must be considered when preparing these plates, mainly in the selecting of the proper color stuff, the concentration of its solution, and the manner of applying it to the plate.

Extensive labors in spectroscopic researches and photographic technics have resulted in giving the practitioner a few reliable colors, selecting them from hundreds experimented with. Among them are many belonging to the eosine group, and a few chinolines. The highest sensitiveness for red must be ascribed to chinoline blue or cyanine; but it is evident that for generally harmonious effect in one many colored object, no pigment gives more correct reproductions than the erythrosine. With it we copy green, yellow and orange perfectly correct, and various shades of red nearly so. Blue and violet, the most active colors upon photographic surfaces, needs, however, to be depressed, and for that reason a yellow glass screen is interposed between lens and film. For objects without predominance of these colors, or when their forcible action will not interfere with the harmony of the copied pictures, the screen may be dispensed with. In artificial light, yellow globes or shades

may be substituted, in fact, the screen is hardly needed in light so rich in yellow rays like gas or petroleum.

It will be natural to ask, in what light must these plates, sensitive to yellow, orange and red be developed. Erythrosine plates, but moderately sensitive to red, may be well developed in the shadow of a much subdued light of the W. I. A. petite lantern. After the developing has proceeded for about two minutes, the coloring matter has been partly washed away and a much brighter light is admissible, yellow or orange, or either of them combined, is absolutely dangerous, and fog will inevitably result from them. Lamp or lantern, covered with several, say, three thicknesses of chocolate-brown tissue paper, gives probably the most secure light, and even the very red sensitive cyanine plate may be admitted to it.

For plates colored in the emulsion, either the ferrous-oxalate or the alkaline developer may be employed. For bathed plates, on account of the ammonia used in preliminary and coloring bath (see formula), the iron developer is greatly objected to, but pyrogallie acid, in combination with any alkali, ammonia, soda or potash, does equally well.

Orthochromatic plates do not allow of much doctoring. In case of over-exposures restraining will be found quite a difficult operation. In no case should another restrainer than bromide of potassium be used.

In regard to time of exposure, the proportions are with erythrosine plates and ordinary emulsion about 3:1 or 6:1, in objects where a variety of colors is found equally distributed throughout the object. If much red in various brightness or darkness predominates, the time must be increased accordingly, sometimes even to as much as 12 and 18 times.

The Scovill Manufacturing Company with its noted desire to place before its patrons the newest accomplishment in photography in concise and convenient form, have prepared, and sell, an erythrosine compound under the name of Flandreau's S. P. C. orthochromatic solutions, which possess all the qualities necessary to give good general color-sensitiveness to an ordinary emulsion plate. The erythrosine solution is accompanied by a yellow, the xanthine collodion, with which the color screen, necessary for ordinary work, is prepared.

With the following formula, orthochromatic plates can be prepared in a few minutes, requiring no longer time than to coat or sensitize a collodion plate; hence Flandreau's solutions offer immense facilities to amateur and professional photographers.

PRELIMINARY BATH.

Aqua ammonia.....	1 dram
Water.....	7 ounces.

COLOR BATH.

No. 1 (erythrosine).....	1½ drams
Aqua ammonia.....	2 "
Water (distilled).....	5½ ounces.

Immerse a plate of medium sensitiveness (Carbut "B") in the preliminary bath, and allow it to remain therein for 3 minutes. After removal drain well, and without washing, plunge the plate in the coloring bath, rocking it gently to secure uniform contact with the solution. The plate should not remain in the color bath longer than 75 seconds, as a long continued exposure to the color solution will depress the general sensitiveness, without increasing that for colors. If a large number of plates are prepared with the same solution, it is advisable to add, after the eighth or tenth plate, about 10 or 20 drops of ammonia. The colored plates must be well drained, reared upon blotting paper and dried in the ordinary drying closet.

Colored plates may be exposed while still wet, and the general sensitiveness is somewhat decreased thereby. If, however, the object to be photographed requires a very long exposure it is better to use a dried plate. These plates may be developed with any energetic developer, the S. P. C. pyro and potash developer being preferable.

Being extremely sensitive to red, orange and yellow, all possible precaution must be taken when preparing, handling and developing these plates. The operations must be carried on in the shade of a dark ruby lamp, or a light subdued by several thicknesses of dark brown tissue paper.

With the interposition of the yellow screen (absolutely necessary for the copying of objects in which blue and violet predominates), the time of exposure may be increased from 3 to 6 times that of an ordinary plate.

For Portraiture, a more sensitive plate (Carbutt Special) may be employed, but the amount of ammonia in both baths must be reduced 50 per cent. Unless there is an abundance of blue or violet drapery, the yellow screen may be dispensed with in making portraits.

The properties of erythrosine permit the photographing by artificial lights, which are rich in yellow or red rays, like the incandescent electric, gas, or petroleum. The time of exposure is then, all other conditions being the same, but a little longer than with ordinary plates in daylight. Fixing, washing, and intensifying are done in the ordinary manner.

Erythrosine being decomposed by light, its solution must be kept in the dark.

To depress the violent action of violet and blue, when predominant, it is indispensable to interpose yellow screens between objective and sensitive plate. To prepare them, a thin, white, plane parallel glass is coated with the xanthine collodion and dried. For conveniency, it had best be surrounded by a slight frame, and then suspended immediately behind the posterior lens of the objective, in the bellows.

The yellow color of the preparation fades by long exposure to light; screens must therefore be kept in the dark, or the coating be frequently renewed.

CHAPTER XVI.

PAPER NEGATIVES.

It is needless to dwell upon the many advantages paper negatives possess over glass, for they will be apparent to any one accustomed to the old process. In consequence of the extreme lightness of the paper, the pleasure of taking pictures is increased ten fold, and the inducements offered to the amateur to take larger photographs enhanced.

The danger of breakage is avoided, thereby making rough transportation perfectly safe.

The compact way in which the negatives can be packed should not be overlooked ; they can be kept in books, thereby affording as easy a means of reference as if it were in a photographic album—a point of much value in any large concern. They can be used in photographic ink printing processes without the need of transfer, so common with glass plates.

The advantage of the lightness of the paper over the weight of glass is especially noticeable in the larger sizes, as, for instance, an entire outfit taking twenty-four 8x10 pictures, which includes a camera, lens, tripod, carrying case and roll holder, weighs less than twenty pounds ; whereas twenty-four 8x10 glass plates weigh of themselves over sixteen pounds, while the wood plate holders weigh fully as much again ; hence, as the roll holder loaded for this size weighs only about three and a half pounds, there is a saving in weight on the outfit of about twenty-eight and a half pounds. A spool of paper for taking twenty-four 8x10 negatives weighs only twelve ounces ; hence each additional twenty-four picture paper roll adds to outfit less than one pound, against over sixteen pounds of glass.

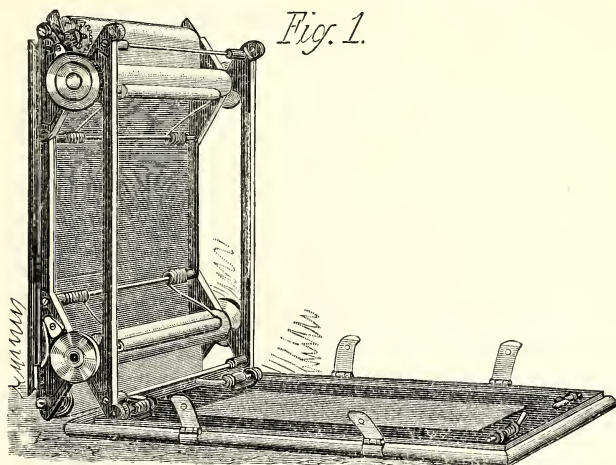
In other words, the amateur can carry an 8x10 outfit with less effort than was formerly expended on a 5x8 glass equipped apparatus, and for each additional twenty-four negatives required the difference is greatly increased.

The retouching of paper negatives is more easily done than on glass, for the back of the negative is worked upon by a pencil; any mistake can be readily erased. With crayon stubs very pretty cloud effects can be worked into the sky of landscape negatives.

The full size of the paper negative is available for printing, and therefore a somewhat smaller film than the glass negative yields the same equivalent in size of the finished photograph.

It is obvious that the most compact and convenient way of using this paper is by means of the roll holder and the spools, for on account of their lightness they can be readily sent in the mails, at a small cost, to various parts of the country.

The Apparatus.—For the purpose of making a large quantity of the sensitive paper available, in a small space,

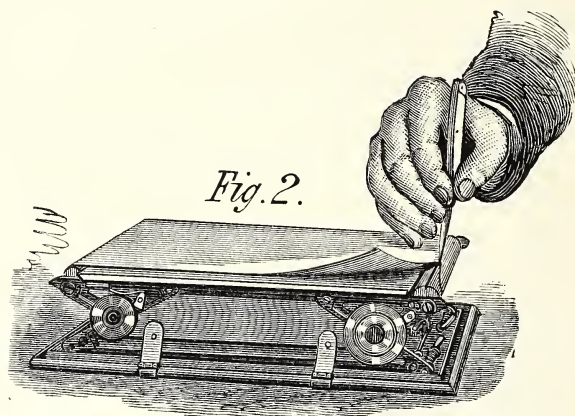


when used in the camera, a holder, termed a "roll holder," has been devised. Fig. 1 illustrates the inside mechanism of the holder when it is thrown up or back, and when ready for use the whole is enclosed in a handsomely finished mahogany outside case, provided on its front side with a suitable slide, as plainly seen in Fig. 6.

Referring to Fig. 1, it will be noticed that the essential working parts of the holder consist of a supply spool holding the sensitive paper, a winding-up reel, a wooden exposing platform of peculiar construction, two guide rolls, and two spring pressure tension rolls, which bear upon the supply spool and

winding reel; all being confined and held between two light metal side frames braced and connected together at their ends by suitable tie rods. The back of the mahogany case is detachable, and is held in place by flat spring metal clamps, fitting over corresponding pins on the side of the case. (See Figs. 1 and 6.) The edge of the case fits in an angular groove cut in the inside surface of the back near its edge, for the purpose of making a light-tight joint, when the case is pressed home.

The light metal frame supporting the working parts is held to the removable back by four spring bolts, one pair at each end, which may be plainly seen on the right end in Fig. 2. By compressing the two bolts simultaneously inward with the thumb and index finger, one end of the frame is released and easily

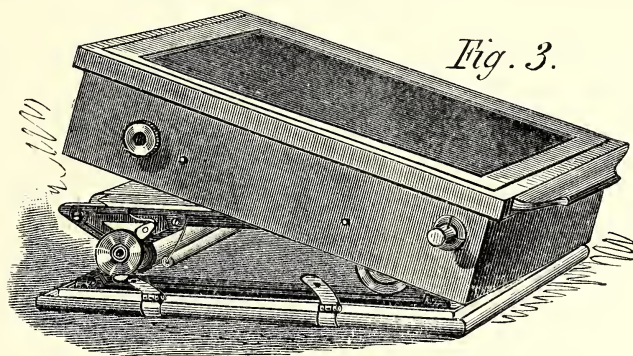


elevated or thrown back, the opposite set of bolts forming a pivot or hinge. In this position the back forms a base to support the frame when placed upright. When the frame is dropped down, the spring bolts are again drawn inward, and in shooting back lock the frame to the back. Thus either end of the frame may be readily elevated, or it may be entirely removed from the back, permitting the operator to obtain easy access to the rollers in the dark room, when attaching and detaching the sensitive paper.

Figs. 2 and 3 show the metal frame down on the back in its normal position. At the extreme end of the metal frame, adjacent to the exposing platform, and having their peripheries

parallel with the surface of the platform, are two guide rolls, of such a diameter that their circumference measures ^{out} one-quarter of the length of the exposing platform or of the length of the picture, whatever size the holder is intended to make; one guide roll, termed also a measuring roll, will be seen at the extreme upper end in Figs. 1 and 4; and at the right hand end also in Fig. 2.

Projecting at each end, slightly above the surface of this guide roll, are two metal points, which puncture the margin of the paper at each revolution, as it passes from the supply spool over the guide rolls and the exposing platform to the reel at the opposite end; a pin projecting



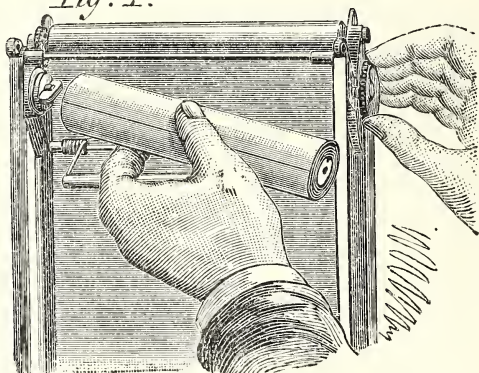
out from one end of the guide roll pushes down a small flat spring secured to the under side of the exposing platform, which, flying up against the under side of the latter, as it is suddenly released, produces a loud click or alarm. In addition to the sound device, a spur wheel is arranged on the shaft of the guide roll at one end, which can be seen in Figs. 1 and 2, so geared that four revolutions of the guide roll will cause a second spur wheel to make one revolution of an indicator seen upon the outside of the case, at its right hand end, Fig. 3, and upper end Fig. 6.

The necessity of providing some accurate yet simple means of measuring the paper as it passes from the supply spool to the reel was apparent to the inventors, and the simple devices, just described, which have been adopted, deserve a word of praise. If the measuring device had been attached to either

the supply spool or reel, to be guided by their respective revolutions, it would have been inaccurate; for as the paper is taken off the supply spool it revolves more rapidly, while with the reel the diameter is rapidly increased in proportion as the paper is wound upon it, and the amount thus taken up must constantly vary. Hence it is the constant diameter of the guide rolls, and the revolving of the same by the passing paper, which furnish an accurate means of measurement.

Passing now from the guide rolls, we come to the supply spool and reel, and the mechanism for rotating and holding them. Both are supported by centres arranged in the metal frame, just under and behind the extreme edge of the expos-

Fig. 4.



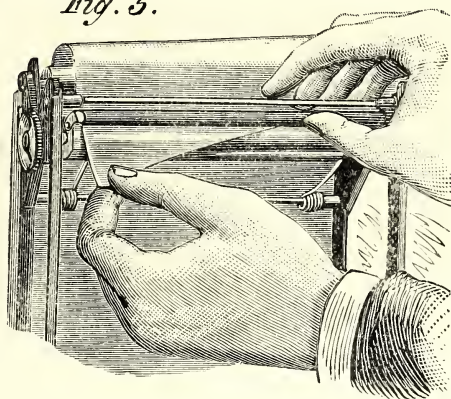
ing platform, their respective positions being seen in Figs. 1, 4, and 5.

In Fig. 1, the supply spool will be noticed at the upper end. Fig. 4 shows a more detailed view of its particular construction, and the manner of its insertion into the roll holder. One end of the spool has a rectangular recess or saw cut, which corresponds to the rectangular-shaped chuck projection on the metal center. The other end has a hole in which the adjustable screw center, seen upon the right of Fig. 4, is inserted. The chuck center has a large milled head on its outer end, outside of the frame, as shown on the upper left hand end in Fig. 1, and a gravity pawl presses upon the periphery of the head, creating a small friction to its movement, acting also as a tension on the paper.

The sensitive paper is sent out already rolled upon the spools in packages, as shown in Fig. 11, and it is only necessary to insert the prepared spool in the holder to obtain a fresh supply; usually enough paper is wound upon a spool for twenty-four exposures; in small sizes forty-eight exposures are furnished.

Fig. 5 illustrates the mode of securing the free end of the paper to the reel. One portion of the circumference of the reel is flattened in the direction of its length, over which lies a metal clamp pivoted upon the ends of the reel. The clamp is easily raised or lowered by a lateral movement, from the flattened surface of the reel. In Fig. 5 the clamp has been raised

Fig. 5.



by the right hand, while the free end of the paper is drawn through with the left, and afterward straightened with both, when the clamp is pressed down, thus securely fastening the paper to the reel; rotating the latter at once winds up the paper. The reel is held between a chuck center and a screw center similar to those holding the supply spool, with the exception that the chuck center has a recess instead of a projection, which peculiar construction prevents any mistake of the spool and reel being attached in the wrong place in the dark room. A small spring pawl rests on the periphery of the milled head of the reel chuck, giving quite sufficient friction thereto to prevent the reel from unwinding. In the center of the

milled head of the reel chuck center is a threaded hole for receiving the screw threaded operating key. The key when screwed into the milled head operates very similarly to the permanent keys attached to small clocks. Rotating it to the right revolves the reel; rotating it to the left unscrews it from the reel. Around the threaded hole is an annular groove, in which the inner edge of the loose tubular key guide drops when the case covers the frame. The threaded hole and annular groove may be seen in the lower milled head, Fig. 1, and the loose tubular guide at the left-hand end of the case in Fig. 3, and lower end, Fig. 6; the latter also shows the key inserted. The object of this construction is to make a light-tight joint around the key aperture. Fig. 12 shows a cross section of the case at the slide side; two brass flat springs running lengthwise along the inner edge of the slide aperture bear upon the margin of the paper as it travels over the exposing platform, preventing it from buckling or curling up.

How to Use it.—Having now described the various parts of the apparatus, I will first explain the operation of inserting and attaching a fresh spool of sensitive paper. By throwing back the spring clamps and drawing out the indicator knob and loose key tube, the outside case with its slide is easily raised from the back, exposing to view the frame and rolls, as shown in Fig. 2. Fig. 3 shows the case partly raised.

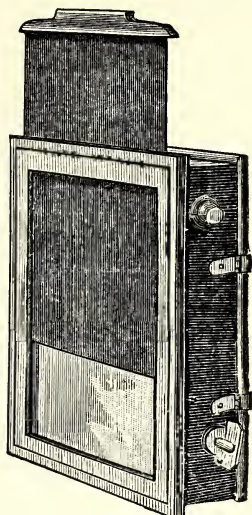
Firmly holding the exposing platform with the left hand, and with the thumb and middle finger of the right compressing inward the two spring bolts on the right-hand end of the back, the frame is elevated, as shown in Fig. 1.

Now, lifting the spring pressure roll or brake, and holding it between the index and second finger of the left hand, while the supply spool is also held between the index finger and thumb, as shown in Fig. 4, the depression or saw cut in the end of the spool is pushed upon the rectangular projection on the center chuck. With the right hand the threaded thumb screw is passed into the hole at the opposite end of the spool, holding the latter firmly in place. The inclosing band, which binds the paper on the spool, is next torn off, the pressure roll released, so that it presses firmly against the spool, and the free end of the paper drawn under and over the guide measuring

roll across the exposing platform, over the second guide roll, down to the reel, as shown in Fig. 5—the frame in the mean time having been reversed on the back, that is, the reel end elevated instead of the spool end.

The paper is fastened to the reel by the flat pivoted clamp as previously explained; and after seeing that it occupies a perfectly central position across the guide rolls, the slack is taken up by means of the tension screw milled head on one end of the reel. The spring pawl is then turned down or replaced, also the gravity pawl on the spool holder milled head, and the frame secured in position on the back by the four spring bolts. The whole is then covered by and fastened to the outside case. The paper should now lie perfectly smooth and flat on the face of the exposing platform.

Fig. 6.



The slide on the front of the case is next withdrawn (see it partly withdrawn in Fig. 6), and with a lead pencil a line is drawn across the paper at each end of the slide opening, for the purpose of determining where the first exposure commences. On replacing the slide, the holder is removed from the dark room and attached to the camera, to which it has been previously fitted, and so arranged that the plane of the exposing platform shall occupy exactly that of the ground glass.

I will now suppose that the object has been properly focused, the ground glass removed, and the holder attached to the back of the camera, the same as an ordinary plate holder, by means of suitable pins and catches. The slide is withdrawn, and the exposure made by uncapping and capping the lens in the usual manner, and the slide replaced. The operating key is screwed home and the indicator tube pressed into place, on to the square head of the shaft of the indicator spur wheel, and fastened by the bayonet catch.

It is now desired to bring a fresh surface upon the exposing table for a new exposure; with the right hand the operator rotates the key similar to the winding of a clock (see Fig. 7), which rotates the reel and carries the paper over the face of the exposing platform; soon a click is heard, and the indicator has made one-quarter of a revolution; then a second, third, and fourth click, when it will be found that the indicator has



made one complete revolution, informing the operator both by sound and sight that a fresh sensitive surface has been brought into place. With each click the metal points on the surface of the measuring guide roll puncture upward the paper at each margin, making four raised dots on each edge for each exposure.

Twelve exposures out of the twenty-four having been made, it is desired that they be separated and removed from the supply spool for the purpose of development; taking the holder to the dark room and removing the outer case, we sever the exposed portion of paper on the reel and on the exposing platform by simply drawing the point of a knife across the length of the measuring guide roll (see Fig. 2). By counting four dots from the end, we come to the end of one exposure. The paper is next drawn by the hand to the right until the fourth pair of dots are brought over the measuring roll, when the sheet is separated as before. Instead of cutting off the exposed sheets in this manner, they may be severed by shears. The reel containing the exposed paper may be bodily removed from the frame in the same manner as the supply spool, and another inserted, and the unexposed paper attached to it, as in Fig. 5, when new exposures may be wound upon it as before.

The spring pressure rollers bearing upon the back of the paper when on the spool or reel prevents the uncoiling of the paper on the same, and thus obviates the danger of abrasion by the loosening and tightening of the paper on itself.

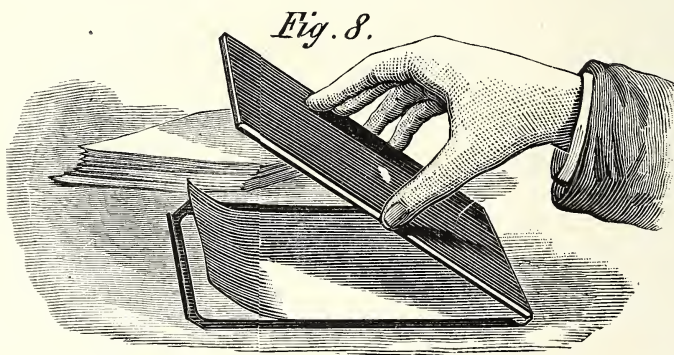
In holders of small size, three clicks and punctures are made instead of four for one exposure; in large sizes as many as five or six. All the parts of the holder are made interchangeable, on the plan of the sewing machine and all American Optical Co. apparatus, thereby making the repair of any damages a very simple matter.

Film Carriers for Use with Scovill Dry Plate Holders.—In cases where it is inconvenient to use a "roll holder," a special carrier has been devised (see Fig. 8) for supporting single sheets of the paper in the ordinary double holder used for glass plates. The carrier consists simply of a thin wood support or plate built up of narrow strips of wood to prevent warping, constructed like the exposing platform in the "roll holder," and has a thin metal mat or frame, which is bent up around the edges, and clasps the plate when it is pressed into it. In Fig. 8 the wood carrier is held in the hand, while the metal mat lies flat; above it may be seen the sheet of paper, one end being partly curled up.

In order to secure the paper to the carrier, the frame is laid

down upon a clean sheet of paper and the sheet of negative paper laid, face down, into it; the wood plate is then pressed down on top of it, and the ends of the frame, springing over the rounded edges of the wood carrier, hold the paper firmly and smoothly against the carrier. As the thickness of the carrier and mat combined does not exceed that of the average glass plate, it can be put into the ordinary plate holder for exposure in the camera.

Simplicity of the Development.—After the paper has been exposed in the camera, the sheets are cut off and developed by a red light in a dark room, similar to dry plates; but they possess a marked advantage over the plates, from the fact that several sheets can be developed at one time, one above



the other, in one developing bath, somewhat in the same way as silver prints are toned. The sheets are first wetted by immersion in a tray of water, and then placed face down one after the other in the developing solution, and moved about in the same until development is finished. They are then washed in water, and fixed in a combined solution of hyposulphite soda and alum, again washed and dried.

Fig. 9 shows the tray upon the table in which is the developer; the bottle and graduates may also be seen. The developed negative is held up by its upper corners, with the fingers for examination of its density before the red light, which is supposed to be on a shelf in front of the operator. The S. P. C. pyro and soda developer, already mixed, is

furnished, thereby insuring the novice perfect success at the outset.

Although silver prints can readily be struck off in the ordinary way in the printing frame from the paper negative, after it is dry, which will show no grain in the shadows, still it is advised, when a large number of prints are to be made, that the negative be made transparent by means of TRANSLUCINE. To apply the Translucine, lay the negative face down upon a pad composed of six thicknesses of folded manilla paper. Pour a little of the Translucine on the back of the negative, and spread with the finger evenly over the surface.

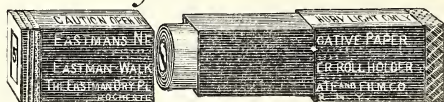
Fig. 10.



In four or five hours the Translucine will have soaked into the paper, rendering it nearly transparent, and free from grain. Heat is not necessary, but may be used to accelerate its action. When the paper is of an even, dark color, wipe off the excess of Translucine with a clean rag, and the negative is ready to print. If the negative is in constant use, an occasional application of the Translucine will keep it in good condition. In this way the paper is very easily made transparent, and the negative is as useful as if it were on glass.

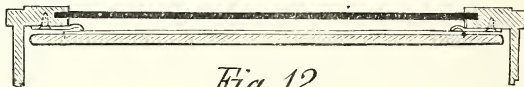
Preparation of the Sensitive Film.—The process consists in giving the paper a preliminary coating of gelatine sufficiently thick to give a plane surface to the paper, filling up all the depressions, and then in calendering the

paper thus coated, so that it presents an absolutely polished surface to the sensitive emulsion, which is, as with the ordinary plates, based on gelatine. The paper is thus prepared in the roll thirty inches in width, and is then, still in the roll, coated with gelatine bromide emulsion in a double application, the second beginning with the end at which the first finished, securing a general equality of the film which no film

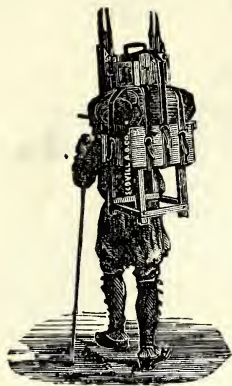
Fig. 11.

on glass attains as a rule, and at the same time obviating in the one application any defects which the other may have had.

I am informed that the machinery employed is large enough to prepare and coat a strip of paper thirty inches wide by 3,800 feet long, and to produce a superior negative paper, possessing the characteristics so desirable in any sensitive film,

*Fig. 12.*

such as extreme uniformity of coating, great sensitiveness, freedom from halation, and other accidental defects often found in glass plates, at a cost much below that of ordinary dry plates, and of equal excellence. The paper possesses a wonderfully fine close texture, and its surface is coated with an extremely sensitive gelatine argentic emulsion.



Old Style Equipment.

THE
SCOVILL
Portable
DRY PLATE OUTFITS
FOR AMATEURS



New Style Equipment.

THE introduction of Dry Plates and the impetus given by them to the cause of Amateur Photography, created a demand for light and compact apparatus that could be easily carried about. That demand the Scovill Manufacturing Company of New York *anticipated and first met* by the introduction of apparatus especially designed for the use of amateurs.

When they announced an Outfit comprising a Camera, Holder, Tripod, Carrying Case, and a good Lens, for \$10, a new era in Amateur Photography began, and it was destined to be henceforth a popular and cultivating recreation.

The Cameras they make for amateurs are not mere toys—they have been used and approved by eminent photographers. Certainly no apparatus can compare with that made by their American Optical Co.'s Factory, in durability, accuracy and elegance of finish. It is in use in all parts of the globe, and has by merit won this wide-spread reputation. Be not deceived by what is copied after it. See that your apparatus bears the brand of their factory.

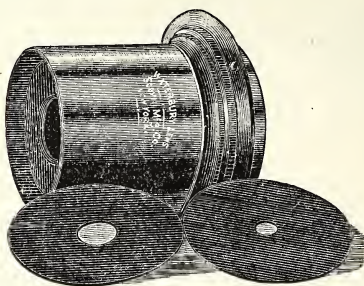
Every article enumerated in this Catalogue has the guarantee of the Scovill Manufacturing Co., established in 1802, and well known throughout the world for fair and honorable dealing as well as for the marked superiority of their photographic apparatus and specialties.

New Catalogues, circulars, etc., will be mailed to any one whose address is sent with the request for such copies.

SCOVILL'S FAVORITE APPARATUS OUTFITS.

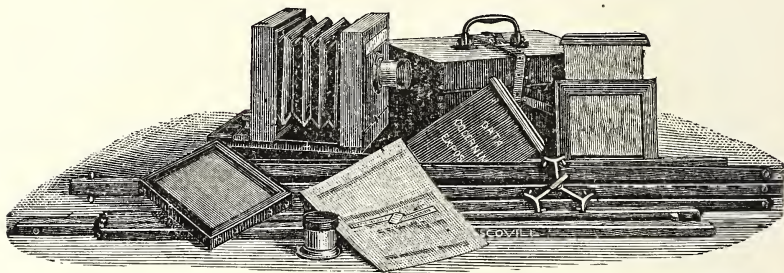
All Articles of which are Warranted Accurate in Every Respect.

These Outfits are lighter, more compact, far handsomer and more accurate than any which are offered at the same price. Many professional photographers have bought them and use them constantly.



In each outfit the Waterbury Lens is worth more than the price of the whole outfit.

FAVORITE OUTFIT A, price \$10.00, comprises



A FAVORITE VIEW CAMERA to produce 4x5 inch pictures, with *vertical shifting front, single swing movement*, rubber bellows and folding platform, with *patent latch* for making bed rigid instantaneously,

1 Scovill Double Dry Plate Holder (Reversible), with *patent Registering Slides*.

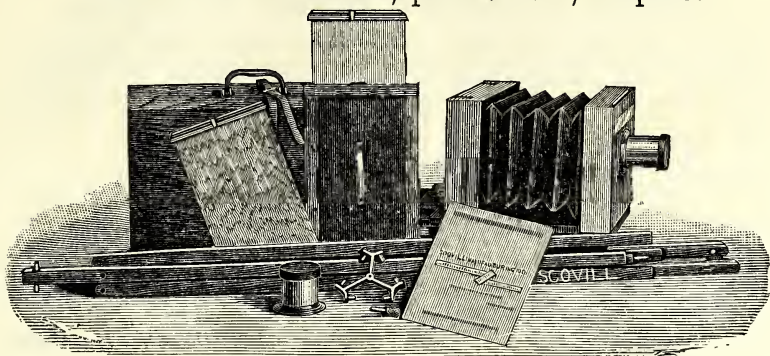
1 Taylor Improved Folding Tripod.

1 No. A "Waterbury" Achromatic Lens with a set of Stops.

1 Carrying Case.

5x7 Favorite Outfit, - - - - Price, \$12.00

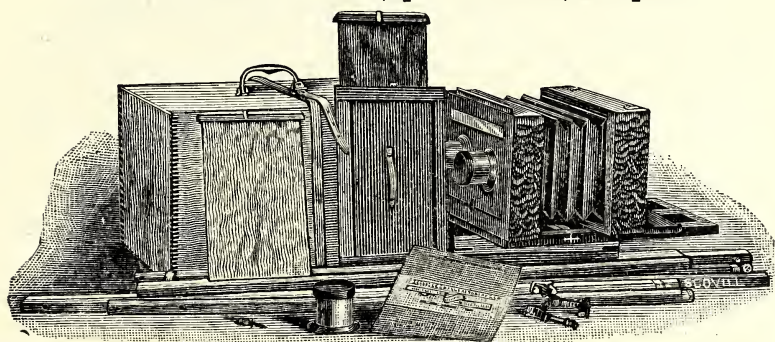
FAVORITE OUTFIT B, price \$12.00, comprises



A FAVORITE VIEW CAMERA, to produce pictures 5x8 inches, with *vertical shifting front, single swing movement*, rubber bellows and folding platform, with *patent latch* for making bed rigid instantaneously ; also

- 1 Scovill Double Dry Plate Holder (Reversible), with *patent Registering Slides, and with Kits.*
- 1 Taylor Improved Folding Tripod.
- 1 No. B "Waterbury" Achromatic Lens *with a set of Stops.*
- 1 Carrying Case.

FAVORITE OUTFIT C, price \$18.50, comprises



A FAVORITE VIEW CAMERA, to produce 5x8 inch pictures, with *vertical shifting front, single swing movement*, rubber bellows and folding platform, with *patent latch* for making bed rigid instantaneously.

This Camera is constructed so as to make either a *Picture* on the full size of the plate (5x8 inches), or by substituting the extra front (supplied with the outfit) and using the pair of lenses of shorter focus, it is admirably adapted for taking *stereoscopic negatives*. Included in this outfit are also

- 1 Scovill Double Dry Plate Holder (Reversible), with *patent Registering Slides, and with Kits.*
- 1 B "Waterbury" Achromatic Lens, *with Stops.*
- 1 Pair "Waterbury" Achromatic Matched Stereoscopic Lenses, *each with Stops.*
- 1 Taylor Improved Folding Tripod.
- 1 Carrying Case.

FAVORITE OUTFIT D, price \$14.00, comprises

A FAVORITE VIEW CAMERA to produce pictures $6\frac{1}{2} \times 8\frac{1}{2}$ inches, with *vertical shifting front, single swing movement*, rubber bellows and folding platform, with *patent latch* for making bed rigid instantaneously ; also

- 1 Scovill Double Dry Plate Holder (Reversible), *with patent Registering Slides, and with Kits.*
- 1 Taylor Improved Folding Tripod.
- 1 No. B "Waterbury" Achromatic Lens *with a set of Stops.*
- 1 Carrying Case.

FAVORITE OUTFIT E, price \$26.00, comprises

A FAVORITE VIEW CAMERA to produce pictures 8×10 inches, with *vertical shifting front, single swing movement*, rubber bellows and folding platform, with *patent latch* for making bed rigid instantaneously; also

- 1 Scovill Double Dry Plate Holder (Reversible), *with patent Registering Slides, and with Kits.*
- 1 Taylor Improved Folding Tripod.
- 1 No. C "Waterbury" Achromatic Lens *with a set of Stops.*
- 1 Carrying Case.

SCOVILL'S NE PLUS ULTRA OUTFITS.

4 x 5 Ne Plus Ultra Outfit, price \$9.00, comprises

A 4 x 5 Ne Plus Ultra Camera, which has single swing, rubber bellows, removable front and folding platform.

- 1 Patent Double Dry Plate Holder.
- 1 Taylor Folding Tripod.
- 1 Waterbury Achromatic Lens with Stops.
- 1 Wooden Carrying Case.

5 x 8 Ne Plus Ultra Outfit, price \$10.00, comprises

A 5 x 8 Ne Plus Ultra Camera, which has single swing, rubber bellows, removable front and folding platform.

- 1 Patent Double Dry Plate Holder.
- 1 Taylor Folding Tripod.
- 1 Waterbury Achromatic Lens with Stops.
- 1 Wooden Carrying Case.

EQUIPMENT A-A.

Consists of FAVORITE APPARATUS OUTFIT A, with

- 1 Scovill Focusing Cloth.
- 1 Dozen 4 x 5 Dry Plates.
- 1 W. I. A. Petite Lantern.

Complete for field service, Price, \$12.00.

EQUIPMENT B-B.

Consisting of FAVORITE APPARATUS OUTFIT B, with the additional articles enumerated in A-A. (Dry Plates 5 x 8 size.)

Complete for field service, Price, \$14.50.

EQUIPMENT C-C.

Consisting of FAVORITE APPARATUS OUTFIT C, with the additional articles mentioned in Equipment A-A. (Dry Plates 5 x 8 size.)

Complete for field service, Price, \$21.00.

EQUIPMENT D-D.

Consisting of FAVORITE APPARATUS OUTFIT D, with the additional articles enumerated in A-A. (Dry Plates $6\frac{1}{2}$ x $8\frac{1}{2}$ inches.) Price, \$17.00.

Where sensitive Plates are taken to a photographer's and there developed, printed from, and mounted on card-board, any of the above Equipments lack nothing that is essential. We recommend the amateur to finish his own pictures, and hence to procure one of the equipments on page 30.

EQUIPMENT A-A-A.—Price \$20.00.

Complete in every Requisite for making the Highest Class Pictures.

LACKING NOTHING FOR VIEW TAKING, DEVELOPMENT AND THE PRINTING AND MOUNTING OF PHOTOGRAPHS.

Consisting of <i>Favorite Apparatus</i> Outfit A.....	\$10 00
Also 1 <i>Developing</i> Outfit 4 x 5 (see page 6.).....	5 25
" 1 <i>Printing and Toning</i> Outfit, 4 x 5 (see page 7.).....	4 87

EQUIPMENT B-B-B.—Price, \$24.50.

Complete in every Requisite for making the Highest Class Pictures.

Consisting of <i>Favorite Apparatus</i> Outfit B.....	\$12 00
Also 1 <i>Developing</i> Outfit 5 x 8 (see page 6.).....	6 50
" 1 <i>Printing and Toning</i> Outfit 5 x 8 (see page 7.).....	6 38

EQUIPMENT C-C-C.—Price, \$31.00.

Complete in every Requisite for making the Highest Class Pictures.

Consisting of <i>Favorite Apparatus</i> Outfit C.....	\$18 50
Also 1 <i>Developing</i> Outfit 5 x 8 (see page 6.).....	6 50
" 1 <i>Printing and Toning</i> Outfit 5 x 8 (see page 7.).....	6 38

EQUIPMENT D-D-D.—Price, \$28.00.

Consisting of <i>Favorite Apparatus</i> Outfit D.....	\$14 00
Also 1 <i>Developing</i> Outfit $6\frac{1}{2}$ x $8\frac{1}{2}$ (see page 6.).....	7 00
" 1 <i>Printing and Toning</i> Outfit $6\frac{1}{2}$ x $8\frac{1}{2}$ (see page 7.).....	7 00

EQUIPMENT E-E-E.—Price, \$42.00.

Consisting of <i>Favorite Apparatus</i> Outfit E.....	\$26 00
Also 1 <i>Developing</i> Outfit 8 x 10 (see page 6.).....	8 50
" 1 <i>Printing and Toning</i> Outfit (see page 7.).....	8 50

SCOVILL'S

Pure Chemicals & Accessories

FOR MAKING NEGATIVES.



We offer for use with any Outfit to make pictures 4 x 5 inches, the following goods packed securely in a wooden case :

- | | |
|---|---------------------------------|
| 1 pkg. S.P.C. Carbonate Soda Developer, | 1 lb. Alum, |
| 2 4 x 5 Glossy Rubber Pans, | 1 bot. S.P.C. Negative Varnish, |
| 1 4 oz. Graduate. | 1 doz. 4 x 5 Dry Plates, |
| 1 Minum Graduate, | 1 Scovill Focusing Cloth, |
| 1 oz. Bromide Ammonium, | 1 Knock-down Lantern, |
| 1 lb. Hyposulphite Soda, | 1 Russell Negative Clasp. |

PRICE, COMPLETE, \$5.25.

For use with any 5x8 Outfit we supply the same goods, with the exception of the substitution of 5x8 Pans and Plates for the 4x5 size.

PRICE, 5 x 8 DEVELOPING OUTFIT, \$6.50.

"	6½x8½	"	"	7.00.
"	8x10	"	"	8.50.

S. P. C.

Outfit for Printing, Toning, Fixing and Mounting 4 x 5 Pictures.

- | | | |
|--|-------------------------|---|
| 1 4 x 5 Printing Frame. | Price complete, \$4.87. | 1 lb. Hyposulphite of Soda. |
| 1 5 x 7 Porcelain Pan Deep. | | 2 dozen sheets 6½ x 8½ Card-board with Gilt Form. |
| 1 4½ x 5½ S. P. C. Vulcanite Tray. | | 1 ½ Pint Jar Parlor Paste. |
| 2 dozen 4 x 5 S. P. C. Sensitized Albumen Paper. | | 1 1½ inch Bristle Brush. |
| 1 bottle French Azotate. } For | | 1 Glass Form (for trimming prints). |
| 1 " Chlor. Gold, 7½ gr. } toning. | | 1 Robinson's Straight Trimmer. |
| 1 2 ounce graduate. | | |

Securely packed in a box, which serves also for a fuming box.

**S. P. C.**

Outfit for Printing, Toning, Fixing and Mounting 5 x 8 Pictures.

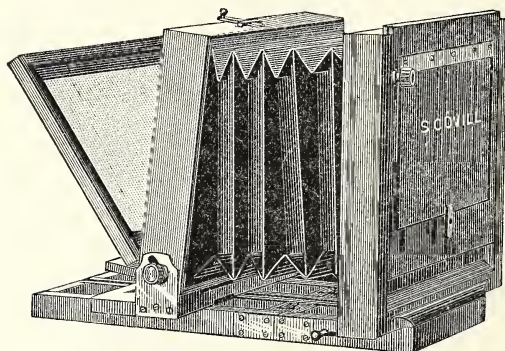
This outfit is like the one on preceding page, but with Printing Frame, Vulcanite Tray, Sensitized Paper, and Card-board adapted for 5 x 8 Pictures.

Price complete, \$6.38. Securely packed in a Paper Box.

6½ x 8½ Printing and Toning Outfit. Price, \$7.00.

8 x 10 " " " " " 8.50.

WATERBURY OUTFITS.



THE WATERBURY CAMERAS, introduced in 1885, are like other cameras and apparatus made by the American Optical Company—unapproachable!

They are made of mahogany, are well polished, have rubber bellows, folding platform, *patent latch* for making bed rigid instantaneously, single swing, vertical shifting front, and are as light and compact as substantial cameras can be constructed.

Fitted with
Eastman-Walker
Roll-Holder.
New Model,
with
Automatic Tally.

4x5 Waterbury Outfits, Complete.....\$12 00 28 00

CONSISTING OF

- 1 Single Swing Camera, described above.
- 1 Scovill Double Dry Holder, with *Patent Registering Slides*.
- 1 Wooden Carrying Case.
- 1 Improved Taylor Tripod
- 1 No. A Waterbury Lens *with a set of Stops*.

LATEST SIZES INTRODUCED	{	4½x5½ Waterbury Outfit, complete	\$14 00
		4½x6½ " " "	15 00
		5x7 " " "	16 00

5x8 Waterbury Outfits, Complete.....\$16 50 38 00

CONSISTING OF

- 1 Single Swing Camera, described above.
- 1 Scovill Double Dry Holder, with *Patent Registering Slides*.
- 1 Wooden Carrying Case.
- 1 Improved Taylor Tripod.
- 1 No. B Waterbury Lens *with a set of Stops*.

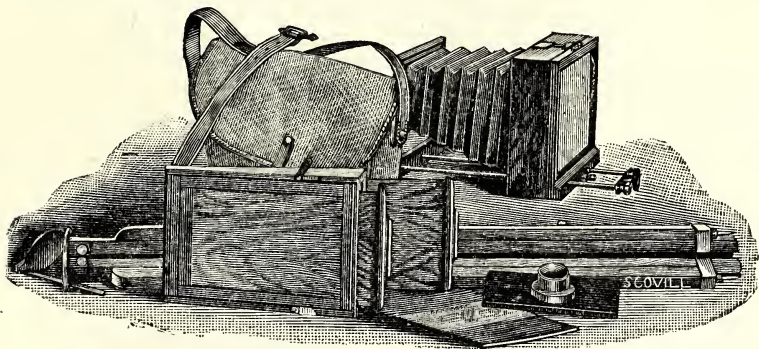
6½x8½ Waterbury Outfits, Complete....\$20 00 44 00

CONSISTING OF

- 1 Single Swing Camera, described above.
- 1 Scovill Double Dry Holder, with *Patent Registering Slides*.
- 1 Wooden Carrying Case.
- 1 Improved Taylor Tripod.
- 1 No. B Waterbury Lens *with a set of Stops*.

Tourists' Pocket Outfits.

When folded up, a 4 x 5 Tourists' Camera measures but $5\frac{1}{4} \times 6\frac{1}{2} \times 2$ inches, and it is without any projecting parts, pins or screws, so that it may be slipped into and not tear a gentleman's pocket. The rods which are used to move forward the front of the camera are easily detached from it and drawn out of the bed. The connector at the other end of the rods is just as readily unset. To replace these three parts when the camera is brought out for service, requires no more time or skill than to take them off. They are nicely adjusted, and are polished and nickel plated, so that they add to the handsome appearance of the camera, and contrast well with its polished mahogany surface and the purple hue of its bellows. The weight of this camera and its dry plate holder (but $1\frac{1}{2}$ pounds for the 4 x 5 size) is on the center of the tripod. In focusing, the front of the camera and the lens are pushed forward, thus avoiding any disarrangement of the focusing cloth. When the focus is obtained, further movement of the lens is checked or stopped by means of a screw acting on a spring, which is pressed at the ends against the focusing rods."



Tourist's Pocket Outfit No. 0206.—4x5 Tourist's Pocket Camera, with
1 Daisy Double Dry Plate Holder, with *Patent Registering Slides*.
1 Scovill Extension Tripod No. 1, with patent reversing attachment.
1 Canvas Carrying Case with Shoulder Strap.

Price, complete, \$21.00.

Tourist's Pocket Outfit No. 0207.—5x8 Tourist's Pocket Camera, with
1 Daisy Double Dry Plate Holder, with *Patent Registering Slides*.
1 Scovill Extension Tripod No. 2, with patent reversing attachment.
1 Canvas Carrying Case with Shoulder Strap.

Price, complete, \$28.00.

We recommend the purchase and use with the above Outfits of a Lens or Lenses selected from the list on page 25.

For Developing and Sensitized Paper Outfits to be used with the above, refer to pages 6 and 7.

CENTENNIAL OUTFITS.

(Introduced in 1876.)

CENTENNIAL OUTFIT No. 202, price \$22.00, Consists of

A MAHOGANY POLISHED CAMERA for taking pictures 4x5 inches, with *Folding Bellows Body*, single swing, hinged bed, and brass guides. It has a shifting front for adjusting the sky and foreground, with

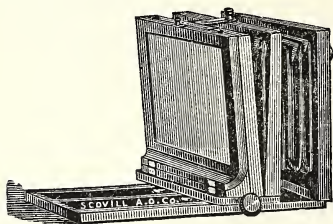
- 1 Daisy Double Dry Plate Holder, with *Patent Registering Slides*; also
- 1 Canvas Carrying Case.
- 1 No. 1 Scovill Adjustable Tripod.

CENTENNIAL OUTFIT No. 202 A, price \$24.00,

The same as No. 202, but with Camera for taking pictures $4\frac{1}{2} \times 5\frac{1}{2}$ inches.

CENTENNIAL OUTFIT No. 202 B, price \$26.00, for pictures $4\frac{1}{2} \times 6\frac{1}{2}$ inches.

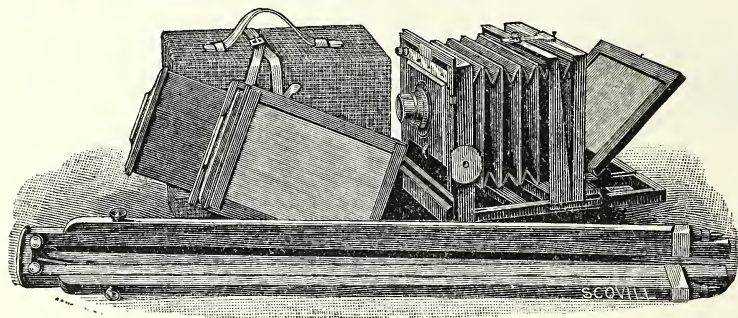
CENTENNIAL OUTFIT No. 203, price \$30.00, Consists of



A FOLDING MAHOGANY CAMERA, well known as the '76 Camera (see illustration). It is adapted for taking 5x8 inch pictures, and also for stereoscopic views—together with

- 1 Daisy Double Dry Plate Holder, with *Patent Registering Slids*; also
- 1 Canvas Carrying Case.
- 1 No. 2 Scovill Adjustable Tripod.

CENTENNIAL OUTFIT No. 204, price \$42.00, Consists of



A FOLDING MAHOGANY CAMERA of finest style and finish for taking $6\frac{1}{2} \times 8\frac{1}{2}$ inch pictures, with

- 1 Daisy Dry Plate Holder, with *Patent Registering Slides*; also
- 1 Canvas Carrying Case.
- 1 Scovill Extension Tripod, No. 3.

For larger or special View Cameras, consult the American Optical Company's Catalogue.

We recommend the purchase and use with the above Outfits of a Lens or Lenses selected from the list on page 25.

For Developing and Sensitized Paper Outfits to be used with the above, refer to pages 6 and 7.

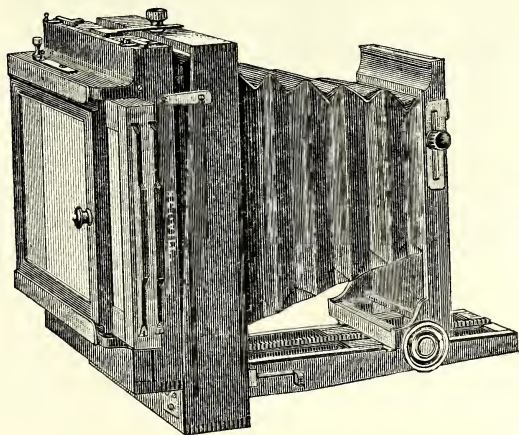
ST. LOUIS

Reversible-Back Cameras.

(PATENTED.)

IN addition to the desirable features which the Back Focus Reversible Camera possesses (see description below) the St. Louis Reversible-Back Cameras have the rack and pinion movement, *patent latch* for making the bed rigid instantaneously, and the ground-glass so arranged that the holder may be slid in front of it, as shown in the illustration.

Each Camera is supplied with one Daisy Holder with *patent Registering Slides* and canvas case.



THE growing use of dry plates, and the desire for rapid exposures, led to the introduction of the American Optical Patented Reversible Back Cameras, and because they add to the grace and celerity of view-taking they have become vastly popular. A novel arrangement of a detachable carriage at the back combines such a multiplicity of adjustments in itself that a dry-plate holder *may be reversed or be set for either an 8x10 upright or horizontal picture*—all of these movements, without once changing the dry-plate holder in the carriage.

SAINT LOUIS REVERSIBLE-BACK CAMERAS.

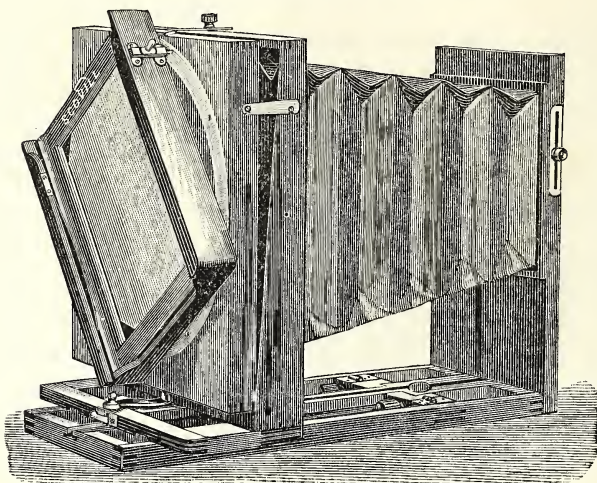
For View.		Fitted with Eastman-Walker Roll Holder. New Model with Automatic Tally.			
		Single Swing-back.	Double Swing-back.	Single Swing-back.	Double Swing-back.
4	x5	\$25 00	\$29 00	.....	.....
4 1/4	x5 1/2	26 00	30 00	.....	.....
4 1/4	x6 1/2	30 00	34 00	.....	.....
5	x7	32 00	35 00	\$52 00	\$55 00
5	x8	34 00	38 00	54 00	58 00
6 1/2	x8 1/2	36 00	40 00	60 00	64 00
8	x10	40 00	44 00	70 00	74 00
11	x14	60 00	64 00	102 00	106 00

Not made above 11x14 size.

Flammang's Patent Revolving-Back Cameras.

(PATENTED.)

Each Incased in a Canvas Bag, with Handle.



(BACK FOCUS PATTERN.)

'These are the finest View Cameras ever constructed,' so says every photographer who has examined any of them, and this exclamation is not merely a tribute to the beauty and grace of their design, for invariably the desire has at the same time been expressed to possess one of these truly novel and substantial Cameras.

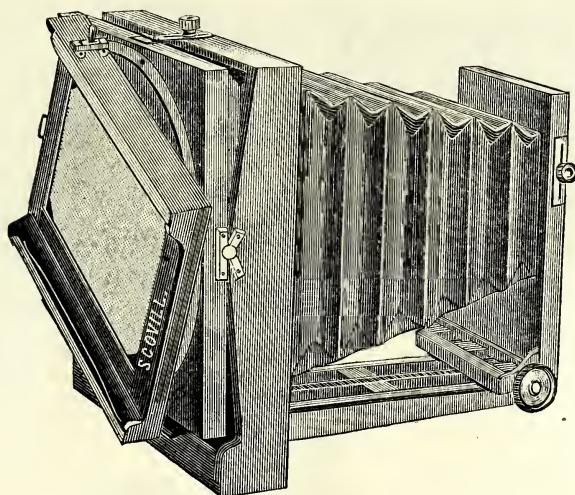
Wherein lies the merit and attractiveness of the Revolving-Back Camera, that photographers want to cast aside cameras now in use and procure one of this new pattern? Briefly stated, it enables the view taker to secure either an upright or a horizontal picture without changing the plate holder after it has been slid into the carriage. No other camera can with such wondrous ease and celerity be changed from the vertical to the upright or *vice versa*. The carriage is simply turned about in the circle and automatically fastened. By this latter provision the carriage may be secured at either quarter of the circle. Ordinarily, the slide will be drawn out of the holder to the right; but in certain confined situations, the ability to withdraw the slide to the left enables the photographer to obtain a view which he could not get with the usual provision in a camera. The photographer of experience is well aware of the difficulty, when taking an upright picture with a large camera without the revolving back feature, of reaching up to draw out the slide at the top, and, what is more essential, of getting out the slide without fogging the plate in the holder.

Grace and strength are combined in the Revolving-Back Camera, and its highly-desirable features are gained without the sacrifice of steadiness or any other essential principle in a good camera. Indeed, its merit is such that out-door photography has been advanced and made more attractive by its introduction.

For a more detailed description consult Scovill's general catalogue.

Revolving-back Camera.

(PATENTED)




(FRONT FOCUS PATTERN.)

PRICE LIST.

Revolving-back Cameras, each incased in a canvas bag, with handle, and above 17x20 size, with two handles.

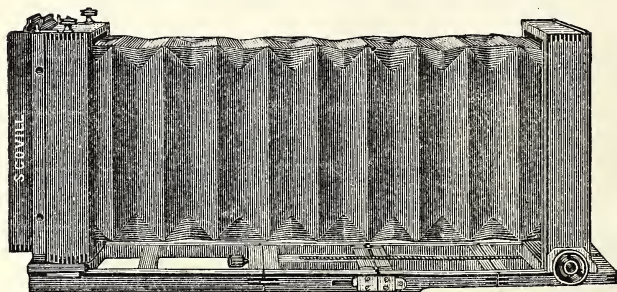
		REVERSIBLE.		Single Swing.	Double Swing.	Fitted with Eastman-Walker Roll Holder New Model, with Automatic Tally.	
						Single Swing.	Double Swing-back.
550A.	For View	4 x 5 in.	.....	\$31 00	\$36 00	\$46 00	\$51 00
551.	"	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$ "	.....	33 00	38 00	.....	.....
551AB.	"	4 $\frac{1}{4}$ x 6 $\frac{1}{2}$ "	.....	34 00	39 00	.....	.....
551A.	"	5 x 7 "	.....	35 00	40 00	55 00	60 00
551B.	"	5 x 8 "	.....	35 00	40 00	55 00	60 00
552.	"	6 $\frac{1}{2}$ x 8 $\frac{1}{2}$ "	.....	45 00	50 00	69 00	74 00
553.	"	8 x 10 "	.....	50 00	55 00	80 00	85 00
554.	"	10 x 12 "	.....	65 00	70 00	101 00	106 00
555.	"	11 x 14 "	.....	77 50	82 50	119 50	124 50
556.	"	14 x 17 "	.....	90 00	95 00	140 00	145 00
557.	"	17 x 20 "	.....	105 00	110 00	170 00	175 00
557A.	"	18 x 22 "	.....	110 00	115 00	185 00	190 00
558.	"	20 x 24 "	.....	120 00	130 00	200 00	210 00
559.	"	25 x 30 "	.....	165 00	175 00	.....	.....

These Cameras are fitted with Daisy Dry-plate Holders.

 Please state, when ordering any size below 10x12, whether front or back focus is desired.

Revolving-back Cameras with front focus not made above 8x10 size.

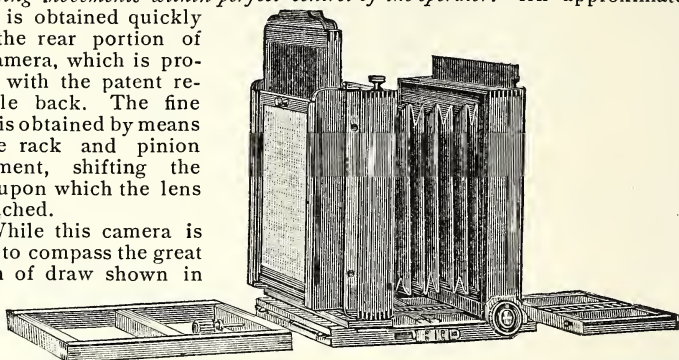
THE SCOVILL MANIFOLD CAMERA.



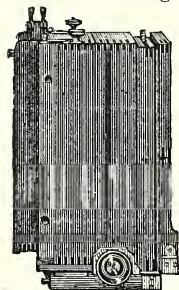
While this camera serves manifold purposes as its name indicates, nothing could be more simple or more easily manipulated. The Manifold Camera has

special advantages peculiar to itself and possesses the greatest number of desirable features which can be combined in a camera without sacrificing lightness and compactness, or having complicated adjustments. The unique device which controls the horizontal and vertical swings was patented by Mr. W. J. Stillman, of the editorial staff of the *PHOTOGRAPHIC TIMES*. To this has been added a central latch for the purpose of bringing the swing movements within perfect control of the operator. An approximate focus is obtained quickly with the rear portion of the camera, which is provided with the patent reversible back. The fine focus is obtained by means of the rack and pinion movement, shifting the front upon which the lens is attached.

While this camera is made to compass the great length of draw shown in



the first illustration, the rear portion of the bed may be wholly detached, and when desired, one-third of the remaining portion of the platform; a great advantage when photographing interiors, when an obtrusive tail board renders focusing almost an impossibility. With one-half of the bed taken off, this camera is still of the usual length of draw. The ground glass, when not in use, is displaced, *not detached*, by having the plate holder slid in front of it. This arrangement of ground glass and plate holder is shown in the second view. Still another noticeable feature is the absence of clamping screws from the front boards, to move which one needs but to press firmly against the lens. The bed folds in front of and behind the camera, and has the patented latch recently devised at the American Optical Co.'s factory. PRICE LIST, including Canvas Case for Camera and one Holder, with *patent Reg. Slides*.



3¼x4¼ size... \$34 00	4¾x6½ size....\$41 00	6½x8½ size. ...\$52 50
4x5 size..... 38 00	5x7 size 42 00	8x10 size. 58 00
4¼x5½ size.... 40 00		

Fitted with Eastman-Walking Roll Holder, New Model:
 4x5 size, \$53 00; 4½x6½, \$58 50; 5x7, \$62 00; 6½x8½, \$76 50; 8x10 \$88 00

THE SCOVILL DETECTIVE CAMERAS.



It has not come to be generally known, but such is the fact, that Artists of renown and shrewd Detectives carry about these Cameras, and pictures are secured by them for their different lines of study through their instrumentality in a manner which is perfectly simple—in fact, it requires no skill other than to get within the range of focus of the unsuspecting victim. As the party, whether man, woman, or child, is not aware that anything unusual is transpiring, the expression of the countenance and the pose are not arranged with reference to their appearance in a picture. A quick working lens is hidden in the camera, and also a few plate holders. By pressing on a spring the whole operation of exposure is completed.

Scovill's Detective Camera, for $3\frac{1}{4} \times 4\frac{1}{4}$ pictures with the marvelous Optimus Lens and three double Dry-plate Holders.....\$50 00

Scovill's Detective Camera, for 4×5 pictures, with the marvelous Optimus Lens and three double Dry-plate Holders..... 60 00

$4\frac{1}{4} \times 6\frac{1}{2}$ Detective Camera, with Beck Lens and three double Dry-plate Holders..... 90 00

5 x7 Detective Camera, with Beck Lens and three double Dry-plate Holders.....100 00

It followed naturally upon the introduction of the Roll Holder that it should be applied to the SCOVILL DETECTIVE CAMERA, and this has been done in a manner that displays the greatest ingenuity.

Attached to each is the Patent Automatic Tally, to record the number of exposures made.

No Roll Holder Camera is complete without this.

Scovill's Roll Holder Detective Camera, for $3\frac{1}{4} \times 4\frac{1}{4}$ Pictures, with the marvelous Optimus Lens, Roll Holder, with Automatic Tally, and one double Dry-plate Holder..... 65 00

Scovill's Roll Holder Detective Camera, for 4×5 Pictures, with the marvelous Optimus Lens, Roll Holder, with Automatic Tally, and one double Dry-plate Holder..... 75 00

Many amateurs have declared that the pleasure of picture-taking was not fully revealed to them until they had procured and tried one of the SCOVILL DETECTIVE CAMERAS.

Photographic Outfits for Bicyclists.



WITH WHICH TO SECURE MEMENTOES OF PLEASANT EXCURSIONS.

So popular has amateur photography become among wheelmen, that the two amusements are now often combined. The Camera allows unbounded opportunities to the amateur bicyclist to gather choice landscape views.

BICYCLISTS' "POCKET" PHOTO-OUTFIT,

Consisting of a $3\frac{1}{2} \times 4\frac{1}{4}$ "Pocket" Camera, with Double Dry Plate Holder, with *patent Registering Slides* and Hinged Ground Glass. This Camera weighs only 12 ounces.

A UNIVERSAL JOINT BICYCLE ATTACHMENT.

A. S. M. C. INSTANTANEOUS LENS, with Stops.

The "Pocket" Bicycle Camera weighs only 12 ounces.

PRICE, - - - \$12.00.

NICKEL-PLATED BICYCLE ADJUSTABLE SUPPORT\$1.50

This has no loose pieces, and is so accurately made as to have no side play.

THE "MIGNON" BICYCLISTS' PHOTO-OUTFIT,

(COMPLETE).

Consisting of a $3\frac{1}{2} \times 4\frac{1}{4}$ Finely Polished Mahogany Camera, with Swing Back, Vertical Shifting Front, Hinged Ground Glass, Folding Bed, with *Patent Latch*, Rack and Pinion Movement (Front Focus).

A Universal Joint Bicycle Attachment.

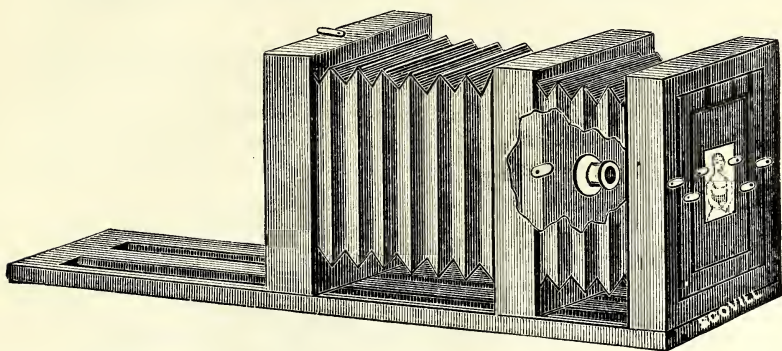
A Morrison Bicycle Lens, pronounced by authorities on optics to be without a peer.

A Canvas Saddle Bag lined with flannel, to prevent marring of the fine finish of the camera.

Price of "Mignon" Bicyclists' Photo-Outfit Complete, \$50.00.
Without Lens, \$25.00.

With the lenses just described, clear, sharp pictures can be obtained which will make fine transparencies and lantern slides, or they can be enlarged up to 8x10 size.

The Scovill Enlarging, Reducing and Copying Cameras.



When ordering, please specify number and sizes of kits wanted.

Size, $6\frac{1}{2} \times 8\frac{1}{2}$,	Price, \$30.00	Size, 11×14 ,	Price, \$60.00
" 8×10 ,	" 35.00	" 14×17 ,	" 72.00
" 10×12 ,	" 48.00		
Size, 17×20 ,		- - \$90.00.	

Special sizes and styles made to order.

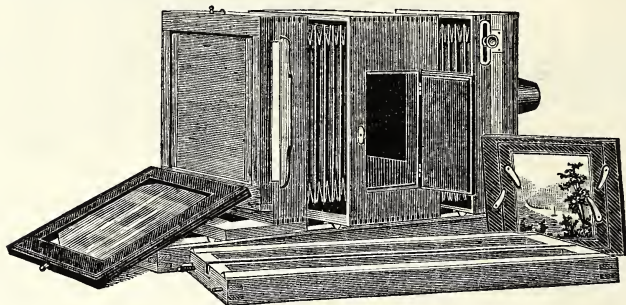
The form of construction of this new Camera is made apparent by the illustration here shown. The experienced copyist will not need any such simple directions for use as we append.

DIRECTIONS FOR USE.

To copy a negative in the natural size, place it in the kit on the front of Camera and button it in. Attached to the center frame of the Camera is a division upon which, on the side toward the Camera front, a Lens is mounted. Suppose this to be a quarter-plate Portrait Lens, the focal length of which we will suppose to be 4 inches—draw back the center frame and the Lens twice the focal length of the Lens (8 inches); slide the back frame with ground glass the same distance from the center frame. To enlarge with the same Lens to eight times the size of the original, the center of the Lens must be $4\frac{1}{2}$ inches from the negative, and the ground glass be 36 inches from the center of the Lens. To reduce in the same proportion, reverse and have 36 inches from the center of the Lens to the negative, and from the center of Lens to ground glass $4\frac{1}{2}$ inches.

WALMSLEY'S PHOTO-MICROGRAPHIC CAMERA.

This instrument (made by the **American Optical Co.**) is the result of several years of practical study by Mr. Walmsley. It is now in use by very many Colleges and leading Microscopists throughout the country, and is confidently offered as an efficient, practical and cheap instrument for the purpose.



It is made in two forms: the cheaper (selling for \$18.00) is adapted only to the making of negatives on plates $3\frac{1}{4} \times 4\frac{1}{4}$, or $4\frac{1}{4} \times 5\frac{1}{2}$, as may be necessary. The complete form (costing \$30) is also a miniature enlarging, reducing and copying camera, admirably adapted to the production of lantern transparencies from any size negative up to $4\frac{1}{4} \times 5\frac{1}{2}$. The following description of the complete camera first published in the PHOTOGRAPHIC TIMES, is also applicable to the cheaper form, excepting that the latter cannot be used for enlarging, reducing or copying. In all other particulars the two boxes are identical.

The camera (of mahogany) is square, carrying a Flammang single plate holder for $4\frac{1}{4} \times 5\frac{1}{2}$ plates; usable vertically or horizontally, and with kits for $3\frac{1}{4} \times 4\frac{1}{4}$ plates. The bellows are in two sections, with a central division of mahogany, which carries a removable partition, to which a suitable rectilinear photographic lens can be attached, for enlarging, reducing, or copying. A light-tight door on one side of this wooden section gives ready access to the lens for inserting or removing diaphragms, or other necessary manipulations, whilst a milled head, accessible from the same opening, clamps the lens bearing section, firmly to the bed of the camera at any desired point.

The bellows have an extension of two feet in addition to the length of the box, sliding very smoothly upon V-shaped ways, which for greater convenience are made in two sections, firmly attached to each other by wooden dowels, and a solid brass screw, worked by a milled head.

The bellows are firmly held at any desired point of extension by a cam, operated by a lever conveniently placed at the rear of the focusing screen which latter is hinged at the bottom, and when not in use, lies out of the

way upon the extension bed. The screen itself is of the very finest ground glass, but is used only for arranging the portion of the object to be photographed properly in the center of the plate, as no surface can be ground finely enough to permit the sharp focusing of any delicately-lined object. For this purpose, a circle or disc of thin microscopic covering glass is attached with balsam to the center of the ground-glass screen, which clears away all the inequalities of the latter, and leaves an exquisitely fine surface to receive the image, which by using an ordinary focusing glass may be as sharply defined as in the eye-piece of the microscope.

The front of the camera (which is double-shifting, for the purpose of centering), carries a cone-shaped tube, which receives the tube of the microscope when the latter is inclined to a horizontal position, and conveys the image bearing rays of light therefrom into the body of the camera. This cone is removable, and in its place may be inserted kits, carrying negatives from quarter to half size for enlargement, or reduction to lantern slides as may be desired. Or a front board, bearing a lens, may be inserted in its place, converting the camera into a copying one. Indeed, a more complete instrument for all the purposes for which it was devised could scarcely be conceived or desired. Its design was the result of several years of work and experiment on the part of Mr. Walmsley; and the Scovill Mfg. Co. have carried out his plans in their usual masterly manner, leaving nothing to be desired.

In use, the camera is attached to a solid platform (which also carries the microscope and lamp) by a screw such as is used with an ordinary tripod. By this means any jar or tremor produced by a passing vehicle or other means, is communicated to microscope and camera alike, preventing any diminution of sharpness in the negative. By this arrangement also, the whole apparatus is so compact that, with the bellows closed, the operator can easily see the image upon the ground glass, and at the same time reach the milled heads upon the microscope controlling the stage and focusing movements, permitting the arrangement of the subject with the greatest nicety. But when the bellows are extended to their full length, some appliance becomes necessary to operate the fine adjustment of focus, whilst the eye can discern the changes upon the screen. This is most simply effected by Mr. Walmsley, in the employment of a fine cord passing in a groove around the periphery of the milled head of the fine adjustment screw, and thence through a series of hook eyes to the rear of the camera bed, where it is held taut by a couple of leaden weights. The slightest pull upon either cord moves the fine adjustment screw with the utmost nicety.

PRICE.

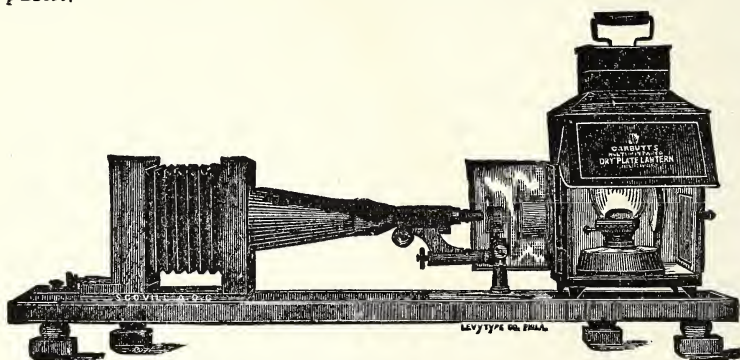
Walmsley Micro-Camera.....	\$18 00
“ “ enlarging, reducing, and copying pattern ..	30 00

SCOVILL'S OUTFIT

For PHOTOGRAPHING with the MICROSCOPE.

Photographing with the microscope has hitherto been accomplished by the aid of elaborate and costly apparatus, and been applied chiefly to making illustrations for scientific magazines. The process used, that of wet collodion in connection with sunlight, involved the procurement of an expensive heliostat to produce a steady illumination, for with any less powerful light the exposure would necessarily be so prolonged that the coating of the plate would dry and become useless. Now all this is changed, for with the modern improvements in photography which are the result of the introduction of gelatine dry plates, the photographing of microscopic objects becomes as easy of accomplishment as the photographing of the beautiful and visible in nature is with the popular amateur outfits.

The scientist and microscopist, instead of spending hours in making imperfect drawings, aided by the camera lucida, may in a few minutes, with the assistance of photography, produce a more perfect representation of a minute object than it is possible for the hand of man to do, working conjointly with the eye. Not only can an enlarged image of a microscopic object be formed for illustration, but professors in colleges will find it a ready means to produce negatives of a suitable size from which may be made transparencies or magic lantern slides for exhibition to classes or the public.



If this is done in the daytime, a room from which all white light is excluded should be selected; but if used at night, as in most cases it would be, the operations may all be performed in the midst of a family group for their interest and amusement, and to impart to them knowledge of the minute life or organisms of the world which the microscope alone can reveal.

Scovill's Photomicroscopic Equipment,

— CONSISTING OF —

- 1 Scovill Special Half Plate Camera.
- 1 Multum in Parvo Lantern, with Double Condenser.
- 1 dozen $4\frac{1}{2} \times 5\frac{1}{2}$ size B Keystone Plates to make Negatives; also
- 1 dozen $3\frac{1}{2} \times 4\frac{1}{4}$ size A Plates for Transparencies.

Price, Complete, \$18.00.

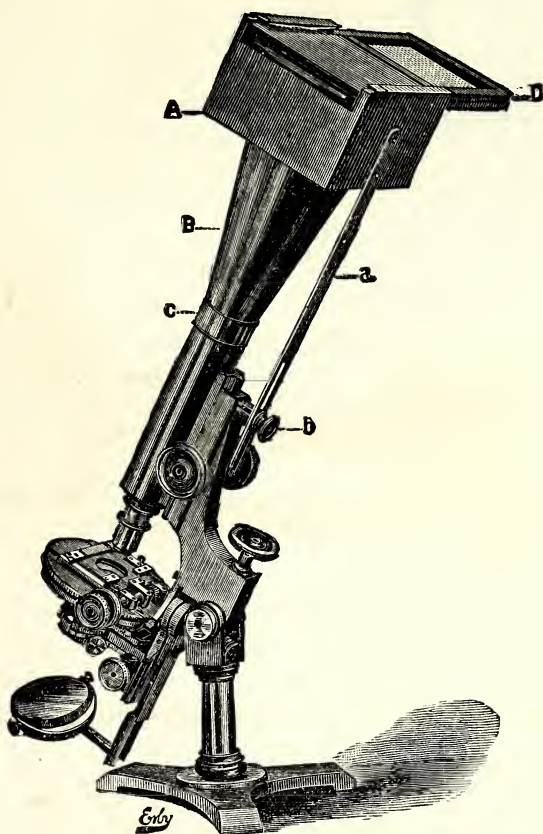
The presumption is that you are provided with a microscope. If not, we recommend the purchase of one from a regular dealer in microscopical goods.

Circular containing directions for use sent with each outfit.

MERCER PHOTOMICROGRAPHIC CAMERA.

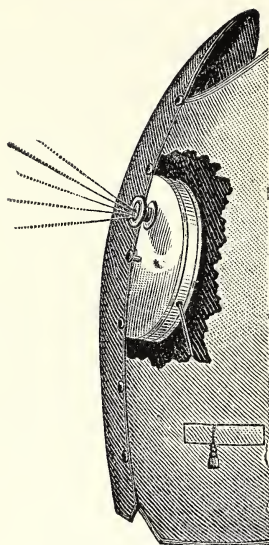
Size, $2\frac{3}{4} \times 3\frac{1}{4}$.

— Price, \$7.50. —



This Camera is provided with a Brass Cone and Plate Holder with Ground Glass attached, to slide back and forth in the carriage, as desired.

The Concealed Camera.



This novel Camera is worn concealed underneath the coat, the lens serving as a button, and is operated from the pocket.

It was designed for the use of those who wish to photograph figures, facial expression, groups in action, and all studies in actual life, where opportunity to sketch or to set up an ordinary camera, arrange the focus, draw slides, and such manipulation are out of the question. Beautiful street scenes, that one could not otherwise photograph, are obtained with this camera.

It makes six pictures on a revolving plate.

PRICE, \$15.00.

Patented by Mr. R. D. GRAY.

Circular Dry Plates, Keystone Lightning Brand, for this Camera, \$1.20 per doz.

Combined Developing and Printing Outfit

FOR USE WITH THE CONCEALED CAMERA, COMPRISES

One $6\frac{1}{2} \times 8\frac{1}{2}$ Flat Printing Frame.

Two $6\frac{1}{2} \times 8\frac{1}{2}$ Japanned Trays.

One W. I. A. Petite Dry Plate Lantern.

One 4-oz. Glass Graduate.

One 1-oz. " "

One Package S. P. C. Pyro and Potash Developer.

One 7 x 9 Glass Pan.

One Dozen Keystone Lightning Dry Plates, Circular Form.

Two Dozen $6\frac{1}{2} \times 8\frac{1}{2}$ Sensitized Paper.

One Bottle French Azotate.

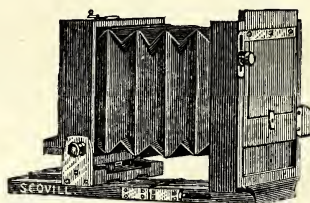
One Bottle Chloride of Gold (small).

One lb. Alum.

One lb. Hyposulphite Soda.

Price of this outfit complete, packed ready for shipment, \$8.00

THE PETITE CAMERA.



This camera was made to suit the refined taste of one of Vassar's fair students. The design on the part of the manufacturers was to reduce the impedimenta for an outing to the minimum, providing a $3\frac{1}{4} \times 4\frac{1}{4}$ camera (to make negatives of suitable size for lantern slides), with single swing, folding bed with *patent latch*, vertical shifting front, and other desirable improvements. So well has the design been carried out that many ladies will follow the example of Vassar's pupils, and learn the fascination of picture-taking with one of these finely-polished mahogany cameras. Gentlemen in search of a pocket camera need not seek further. The Petite Camera and an enlarging camera will by many be considered a satisfactory and complete equipment for such photographing as they desire to do.

PRICE.

Petite Camera with one double Dry-Plate Holder, and <i>patent Registering Slides</i>	\$12 00
Same Camera with canvas bag, with shoulder strap and Scovill's Adjustable (feather weight) Tripod.....	17 00

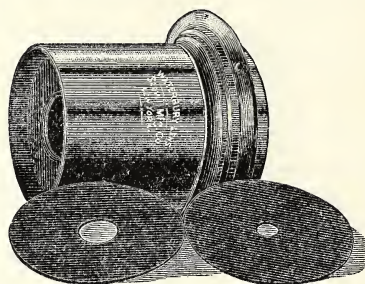
Scovill's Outfit for Making Lantern Slides consists of

- 1 doz. Thin Crystal Glass.
- 2 " Black Mats.
- 1 package Black Adhesive Paper.
- 1 doz. $3\frac{1}{4} \times 4$ Keystone Gelatino-Albumen Dry Plates.
- 1 package S. P. C. Pyro and Potash Developer.
- 2 $4\frac{1}{4} \times 5\frac{1}{2}$ Solid Glass Pans.
- 1 lb. Hyposulphite Soda.

The above, packed in wooden case, price complete..... \$3 50

For enlarging, reducing, or copying Negatives to make Lantern Slides, we recommend the use of one of the Scovill Enlarging, Reducing and Copying Cameras.

WATERBURY LENSES.



The unprecedented success which has everywhere resulted from the employment of the smaller Waterbury Lenses—those for 4 x 5 and 5 x 8 respectively (and which are achromatic combinations composed of a bi-convex Lens of crown glass cemented to a plano-convex Lens made of the best flint glass)—has induced the Scovill Manufacturing Company to extend the capabilities of this favorite objective, and to issue one of larger dimensions and longer focus than either of the others.

This new lens, which is designated “The ‘C’ Waterbury Lens,” possesses all the excellent qualities of those of smaller size, while it takes a negative of greatly increased dimensions. It produces a negative on an 8 x 10 plate with great perfection, although some photographers do not hesitate to use it on a 10 x 12 plate. The lens is constructed of the finest optical glass, and has a diameter of $2\frac{1}{4}$ inches, its focus being 15 inches. When the largest stop is employed this lens is capable of producing fine portraits—especially busts—on a twelve-inch plate.

It has diaphragms of three different diameters, these being carefully calculated so as to suit the various exigencies under which a lens is employed.

PRICE.

A, Single, for 4 x 5 plate.....	\$3 50
A, Matched pair, stereoscopic.....	7 00
B, Single, for 5 x 8 plate.....	4 50
C, “ “ 8 x 10 plate.....	8 00

Morrison's Wide-Angle View Lenses.



Patented May 21, 1872.

These Lenses are absolutely rectilinear; they embrace an angle of fully 100 degrees, and are the most rapid *wide-angle* lenses made.

No.	Diameter of Lens.	Size of Plate.	Equivalent Focus.	Price.	
1.... $\frac{3}{4}$ inch..	$3\frac{1}{4}$ x $4\frac{1}{4}$ inch.	3 inch, each,	\$25 00	These 5 sizes will fit into 1 flange.	
2....1 " "	4 x 5 " "	$3\frac{1}{2}$ " "	25 00		
3....1 " "	$4\frac{1}{2}$ x $7\frac{1}{2}$ " "	$4\frac{1}{4}$ " "	25 00		
4....1 " "	5 x 8 " "	$5\frac{1}{4}$ " "	25 00		
5....1 " "	$6\frac{1}{2}$ x $8\frac{1}{2}$ " "	$6\frac{1}{2}$ " "	25 00		
6....1 " "	8 x 10 " "	8 " "	30 00	These 2 sizes will fit into 1 flange.	
7.... $1\frac{1}{4}$ " "	11 x 14 " "	$10\frac{1}{2}$ " "	40 00		
8.... $1\frac{1}{4}$ " "	14 x 17 " "	14 " "	50 00	These 3 sizes will fit into 1 flange.	
9.... $1\frac{1}{2}$ " "	17 x 20 " "	17 " "	60 00		
10.... $1\frac{1}{2}$ " "	20 x 24 " "	22 " "	80 00		
11.... $1\frac{3}{4}$ " "	25 x 30 " "	28 " "	100 00		

Nos. 1 to 6 are all made in matched pairs for stereoscopic work. The shorter focused Lenses are especially adapted for street and other views in confined situations. For general purposes, a pair of No. 5 Lenses will be found most useful.

Morrison Combination Wide-Angle Lens.

Opening the velvet-lined morocco case presented to us for our inspection, we find partitioned-off space containing an ordinary 5-inch Morrison Wide-Angle Lens, on which the front and back combinations are distinctly marked with the figure 5.

Besides this, in cells, are four mountings with lenses of varying focal lengths, each marked in white with a number. By unscrewing the back combination marked 5, and putting in its place the mounting marked 6, a lens of 6-inch back focus is obtained.

Again, by removing both these cells and replacing them with the two marked 8, a lens of 8-inch back focus is the result.

By screwing in the front combination marked 5 and the back combination marked 4, a lens of 4-inch back focus is obtained.

Putting a front combination marked 8 and a back marked 6, a focus of 7 inches is produced.

Thus the operator has a choice of five focal lengths with the one lens.

Price for Morrison Combination Wide-Angle Lens, \$80.

Morrison's Instantaneous Wide-Angle View Lenses.

With full opening, these Lenses have all the extreme depth for which the Morrison Regular Wide-Angle Lenses are noted. They work with extreme rapidity, and will cover an angle of 90 degrees sharp. Furnished with a set of diaphragms.

Diameter of Lens.	Size of Plate, Full Opening.	Size of Plate when Stopped Down.	Focus.	Price.
$\frac{7}{8}$ inch.	4x 4 inches.	5x 7 inches.	6 inches.	\$30 00
1 " "	4x 5 " "	8x10 " "	8 " "	35 00
$1\frac{1}{4}$ " "	5x 8 " "	10x12 " "	10 " "	40 00
$1\frac{3}{4}$ " "	8x10 " "	14x17 " "	12 " "	45 00

CUNDLACH

Rapid Rectigraphic Lenses.



The splendid qualities of the **Rectigraphic** (it being constructed on a principle superior to that employed in the construction of any other photographic lens in the market), have won for it, in the short time it has been before the photographic public, a well recognized place in the front rank of photographic objectives.

It possesses all the qualities required to make it equally valuable for either Landscape or Portrait Work. For the latter purpose we recommend especially the larger sizes, from No. 4 up. When used with the Modern Dry Plate they will equal the best Portrait Lenses in rapidity, while, with their full opening, they have wonderful depth and microscopic sharpness.

The RECTIGRAPHIC is superior to any lens in the market in flatness of field, and is the only one that can be focused sharp at the extreme edge of the field, being free from astigmatism.

Each lens is supplied with a set of Diaphragms in a Morocco Case.

GUNDLACH

Rapid Rectigraphic Lenses.

DESCRIPTION AND PRICE.

No.	Size of Plate.	Size of Portrait.	Diam. of Lenses.	Back of Focus.	Equivalent Focus.	Price.
1	4x5	3 $\frac{1}{4}$ x4 $\frac{1}{4}$	1	5 $\frac{7}{8}$	6 $\frac{1}{4}$	\$20.00
2	5x8	4x6	1 $\frac{1}{4}$	7 $\frac{1}{2}$	8	30.00
3	6 $\frac{1}{2}$ x8 $\frac{1}{2}$	5x8	1 $\frac{1}{2}$	9 $\frac{1}{4}$	10	38.00
4	8x10	6 $\frac{1}{2}$ x8 $\frac{1}{2}$	1 $\frac{3}{4}$	11	12	50.00
5	10x12	8x10	2	13 $\frac{1}{8}$	14 $\frac{1}{4}$	64.00
6	11x14	10x12	2 $\frac{1}{4}$	15 $\frac{1}{4}$	16 $\frac{1}{2}$	76.00
7	14x17	12x15	2 $\frac{5}{8}$	17 $\frac{1}{2}$	19	125.00
8	17x20	16x18	3	20	22	150.00

GUNDLACH

Wide-Angle Rectigraphic Lenses.

In presenting this Objective to the consideration of the photographic public, we do so confident that it is the best and most rapid wide-angle Photographic objective in the market. It is absolutely rectilinear, and possesses, in so far as any wide-angle lens can, the qualities that have won so much favor for the RAPID RECTIGRAPHIC.

No.	Size of Plate.	Diameter of Lenses.	Back Focus.	Equivalent Focus.	Price.
1	5x7	$\frac{7}{8}$ in.	4 $\frac{1}{8}$ in.	4 $\frac{1}{2}$ in.	\$24.00
2	6 $\frac{1}{2}$ x8 $\frac{1}{2}$	1 $\frac{1}{8}$ "	5 $\frac{1}{2}$ "	6 "	30.00
3	10x12	1 $\frac{1}{2}$ "	7 $\frac{3}{8}$ "	8 "	40.00
4	14x17	2 "	9 $\frac{3}{4}$ "	10 $\frac{1}{2}$ "	55.00
5	17x20	2 $\frac{5}{8}$ "	13 $\frac{1}{8}$ "	14 "	80.00

List of Caps, Diaphragms, Etc., for the Rapid Rectigraphic Lens.

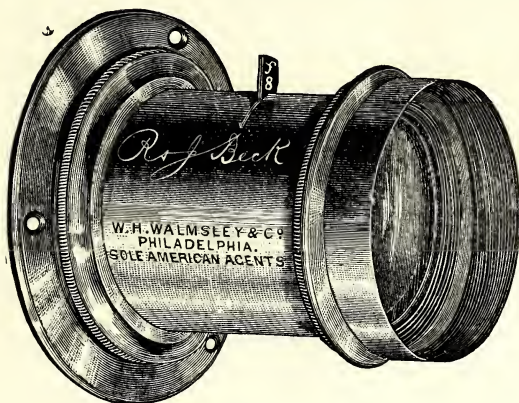
	1	2	3	4	5	6	7	8
Flange.....	\$0.45	\$0.65	\$0.75	\$1.00	\$1.30	\$1.60	\$2.50	\$3.00
Diaphragms.....	.80	1.20	1.75	2.25	2.75	3.40	5.75	6.75
Case.....	.35	.40	.45	.50	.65	.75	1.25	1.50
Caps.....	.35	.40	.45	.50	.65	.75	1.25	1.50

Beck Autograph Rectilinear Lenses.

None genuine without this engraved on the tube.

R. J. Beck.

Without exception the finest Lenses ever made, possessing qualities entirely their own.



5 x 4. ACTUAL SIZE.

These Lenses are perfectly Aplanatic, covering with full aperture to the extreme corners the size plate for which they are designated in the list, and much larger sizes when moderately stopped down. They are very rapid in action rendering them particularly valuable for instantaneous and short-time exposures; are rigidly rectilinear and symmetrical; possess wonderful penetration and definition, and are the lightest

and most compact of any lenses in the market—a matter of no small moment to the landscape photographer. The No. 5 Lens will make life-size heads, sharp and free from distortion. They are in use in many of the leading galleries of the country.

No.	Size of Plate.	Diameter of Lenses.	Back Focus.	Equivalent Focus.	Angle.	Price.
1	3¼ x 4¼	⅞ in.	4½ in.	5 in.	75°	\$25 00
2	4¼ x 5½	1 in.	6 in.	6¾ in.	70°	30 00
3	5 x 8	1¼ in.	8 in.	8¾ in.	64°	35 00
4	6½ x 8½	1½ in.	10¼ in.	11 in.	67°	45 00
5	8 x 10	1¾ in.	12¼ in.	13 in.	66°	60 00
6	10 x 12	2 in.	14½ in.	16 in.	66°	75 00
7	11 x 14	2¼ in.	16¾ in.	18 in.	66°	100 00
8	14 x 17	3 in.	22 in.	24 in.	66°	160 00
9	20 x 22	3¾ in.	27½ in.	30 in.	66°	200 00

STEINHEIL LENSES.

QUALITY not quantity governs in determining the price of lenses. By an examination of the following price list, which supercedes all previous ones, it will be seen that Steinheil lenses are sold lower than any first-class lenses with which alone they may be compared. The introduction of Steinheil lenses marked an important advance in photographic optics.

[HOW TO SELECT A STEINHEIL LENS.

In order to meet the various requirements, and to insure in each special case as perfect work as possible, we make lenses of different constructions.

Our lenses are divided into six *series*, presented in the order of their respective rapidities. Each series begins with No. 1 for the smallest size, and continues upwards. To avoid errors, it is therefore necessary in ordering to quote both the number of the series and the number of the lens in the present catalogue.

All our lenses are rectilinear and are strictly corrected for spherical errors and chemical focus.

They are free from disturbing reflections, and strongly illuminated objects can be taken with them without producing flare or light spots. They are, moreover, constructed so as to give the greatest possible equality of definition over the whole picture.

In focusing with these lenses, it is advisable to use the largest stop, even when it is intended to work with the smallest.

The scientific basis of our establishment and the precise methods employed both in the manufacture of our astronomical and photographic apparatus, enable us to produce lenses of such uniform accuracy, that the means of most vigorous testing at our command fail to reveal any differences in the instruments we send out.

We make it a special point never to supply a lens which is capable of improvement at our hands.

According to the principle involved in their construction, our lenses consist chiefly of two classes, viz.: *Antiplanatic* and *Aplanatic*.

Antiplanatic Lenses.

(U. S. Patent Nos. 241,437-'8.)

Briefly stated, these lenses which are the result of a series of calculations extending through several years, are composed of two non-symmetrical combinations each of as great but opposite faults as possible, which correct each other. One combination has a shorter focus than the objective as a whole, and the other has a negative focus. The combinations are placed very closely together.

By the peculiar construction, as described above, differing widely from the usual forms, it has been possible to correct to a considerable extent the hitherto greatest defect in photographic objectives, viz., "Astigmatism," and the consequent rapid decrease of definition from the center to the margin of the picture.

The result is greater sharpness and depth distributed more equally over a larger and strictly even picture, before any decrease in definition is perceptible.

Illumination, too, is more evenly distributed in consequence of lenses being proportionately nearer together.

These properties allow the lenses to be worked with full aperture or large stops, and gives them great rapidity of action.

The perfectly correct delineation produced by the antiplanets render them particularly suitable for enlargements as well as for dissolving view apparatus.

If small and sharp originals are taken, and subsequently enlarged, depths are obtained which would be unattainable in larger pictures taken *direct* with same amount of light. For this purpose, which will probably play an important part in photography, the antiplanets are specially suitable.

In making enlargements the front lens of the antiplanets should always be turned towards the enlarged picture, and the back lens towards the object to be enlarged.

This construction is designed for strictly even and correctly delineated pictures, and all tilting of the camera should be decidedly avoided and a movable lens board used instead.

The antiplanets are made in two series: The portrait antiplanets (Series I.) and the group antiplanets (Series II.), the latter being, however, also excellent dry plate portrait lenses.

Aplanatic Lenses.

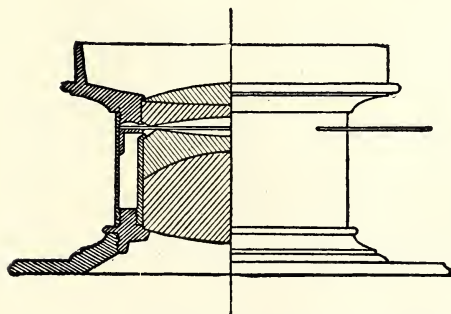
These lenses consist of the original and now well-known symmetrical and rectilinear combinations. They are made in four series, each of which is especially designed for a certain class of work. Their capabilities and object are fully explained below.

The lenses of Series V., also Series III., No. 1; Series IV., Nos. 1 and 2 have rotary diaphragms.

All the other lenses are furnished with Waterhouse diaphragms in morocco case.

STEINHEIL LENSES.

Series II.—Patent Antiplanatic Group Lens.



New in principle and construction, consisting of two non-symmetrical cemented pairs, placed so closely together, that there is only just room for the diaphragm. It is rectilinear, and is remarkable for its powerful and even illumination and depth of focus. In rapidity, it is only excelled by the regular and expensive portrait combinations.

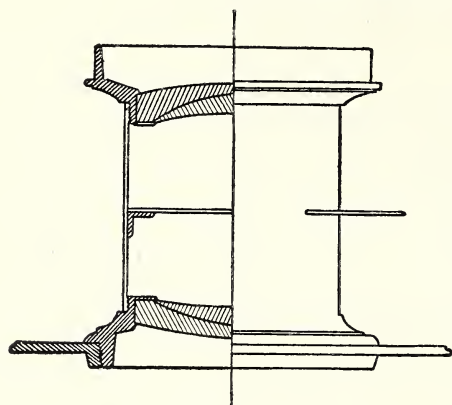
Designed for *Portraits, Groups, Architecture, Landscape, Instantaneous Work and Enlargements.*

Series II.—Patent Antiplanatic Group Lenses.

No.	Aperture, Inches.	Focal Length, Inches.	Size of Portraits or Groups, Inches.	Size of View or Landscape, Inches.	Price.
1.....	11-16	$3\frac{3}{4}$	$3\frac{1}{4} \times 3\frac{1}{4}$	$4\frac{1}{4} \times 3\frac{1}{4}$	\$21 00
2.....	1	$5\frac{5}{8}$	$4\frac{1}{4} \times 3\frac{1}{4}$	5 x 4	28 00
3.....	1 5-16	$7\frac{1}{4}$	5 x 4	7 x 5	37 00
4.....	1 11-16	$9\frac{1}{2}$	7 x 5	$8\frac{1}{2} \times 6\frac{1}{2}$	48 00
5.....	$1\frac{7}{8}$	$10\frac{7}{8}$	$8\frac{1}{2} \times 6\frac{1}{2}$	10 x 8	60 00
6.....	$2\frac{1}{2}$	$14\frac{1}{8}$	10 x 8	12 x 10	95 00
7.....	3 1-16	$17\frac{3}{4}$	12 x 10	15 x 12	140 00

Price for two identical combinations for Stereo Work, No. 1, \$44; No. 2, \$60; No. 3, \$77.

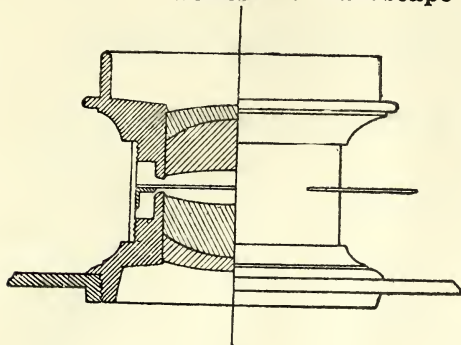
Detective camera lens of this series, focus about $4\frac{3}{4}$ inches, now in preparation.

Series III.—Aplanatic Lens.

The prototype of all rapid symmetrical and rectilinear lenses. Is now made with increased illumination and rapidity. Next to the Antiplanatic Group Lens, Series II., it is the best lens for general work. Designed for *Portraits, Groups, Architecture, Landscape and Instantaneous Work.*

No.	Aperture, Inches.	Focal Length, Inches.	Size of Portraits or Groups, Inches.	Size of View or Landscape, Inches.	Price.
1.....	$\frac{1}{4}$	$15\frac{5}{8}$	For enlarging,		\$ 18 00
2.....	$\frac{5}{8}$	$3\frac{3}{4}$	$3\frac{1}{4} \times 3\frac{1}{4}$	$4\frac{1}{4} \times 3\frac{1}{4}$	18 00
3.....	1	$5\frac{5}{8}$	$4\frac{1}{4} \times 3\frac{1}{4}$	$5\frac{1}{2} \times 4\frac{1}{4}$	25 00
4.....	$1\frac{1}{4}$	$7\frac{1}{2}$	$5\frac{1}{2} \times 4\frac{1}{4}$	7 x 5	32 00
5.....	1 11-16	11	$8\frac{1}{2} \times 6\frac{1}{2}$	10 x 8	44 00
6.....	2 1-16	$14\frac{1}{8}$	10 x 8	12 x 10	57 00
7.....	$2\frac{3}{8}$	$17\frac{3}{8}$	12 x 10	14 x 11	86 00
8.....	2 15-16	21 3-16	17 x 14	20 x 17	125 00
9.....	3 7-16	25	20 x 17	22 x 18	166 00
10.....	4 9-16	33	22 x 18	24 x 20	245 00

Price for two identical combinations for Stereo Work, No. 2, \$38; No. 3, \$52; No. 4, \$67.

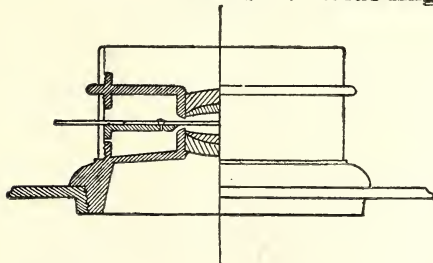
Series IV.—Landscape Aplanats.

Angle about 75 deg., and covering a larger field than the lenses of Series III. Specially designed for *Landscape Work* and *Architecture*, but can also be advantageously used for *Copying*.

No.	Aperture. Inches.	Focal Length. Inches.	Size of Full Aperture. Inches.	Picture, Smallest Stop. Inches.	Price.
1.....	3-16	23/8	2 x 1 1/2	3x2 1/2	\$18 00
2.....	3-8	3	2 1/2 x 2	4x3	21 00
3.....	1/2	4 3/4	3 3/4 x 3	6x5	26 00
4.....	3/4	6 3/8	5 x 4	8x6	32 00
5.....	1	9 1/2	7 x 5 1/2	11x8	44 00
6.....	1 1/2	15 3/8	10 x 8	14x11	86 00
7.....	2 1/8	23 5/8	14 x 11	20x16	160 00

It is frequently desirable to get a landscape from a given point and to get it just of the size to cover your plate, or of any other given size without changing your position. This can only be accomplished by using objectives of different foci, by which you can reduce or enlarge the image at will. For this work we have arranged a *Set of Four Landscape Aplanats*, fitting in the same flange, aperture 1 in., and foci respectively 9 1/2, 12 5/8, 15 3/4 and 19 ins., covering 7x5 1/2 ins. with full aperture, and 11x8 ins. with smallest stop. Price, in neat lock-up case, \$168.

Sets of any number and class of aplanats made to order at proportionate prices.

Series V.—Wide-Angle Aplanat.

The proportionately short focus and large angle (about 100 deg.) of these lenses make them particularly adapted for *Interiors*, *Architecture*, and for very high, broad objects taken from short distances.

No.	Aperture. Inches.	Focal Length. Inches.	Size of Sharp Pictures. Inches.	Price.
1.....	3-16	3 3/4	5 x 5	\$26 00
2.....	5-16	4 3/4	7 x 7	30 00
3.....	7-16	7 1/4	10 1/4 x 10 1/4	42 00
4.....	9-16	10 3/8	12 1/4 x 12 1/4	61 00
5.....	14-16	16	18 1/2 x 18 1/2	93 00

Special quotations for larger sizes.

Ross Rapid Symmetrical Lenses,

FITTED WITH WATERHOUSE DIAPHRAGMS.

Size of View.	Size of Group.	Diameter.	Equiv. Focus.	Price.
4 x 5	3 $\frac{1}{4}$ x 4 $\frac{1}{4}$	1 inch.	6 inch.	\$34 00
4 $\frac{1}{2}$ x 7 $\frac{1}{2}$	4 x 5	1 $\frac{1}{4}$ "	7 $\frac{1}{2}$ "	42 00
5 x 8	4 $\frac{1}{2}$ x 7 $\frac{1}{2}$	1 $\frac{3}{8}$ "	8 $\frac{1}{2}$ "	46 00
6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	5 x 8	1 $\frac{1}{2}$ "	11 "	52 00
8 x 10	6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	1 $\frac{3}{4}$ "	13 "	68 00
10 x 12	8 x 10	2 "	16 "	84 00
11 x 13	9 x 11	2 $\frac{1}{4}$ "	18 "	92 00
12 x 15	11 x 14	2 $\frac{1}{2}$ "	20 "	116 00
16 x 18	12 x 15	3 "	24 "	148 00
18 x 22	16 x 18	3 $\frac{1}{2}$ "	30 "	200 00
22 x 25	18 x 22	4 "	34 "	240 00

These lenses are free from "flare" and distortion, and give absolutely straight marginal lines, rendering them invaluable for all kinds of architectural subjects, dimly-lighted interiors, copying, and instantaneous work.

Ross Portable Symmetrical Lenses.

For landscapes, architecture or copying ; giving wide or ordinary angles, according to the stop used. A great favorite with English amateurs. Unequaled for photographic work.

No.	Large Stop.	Med. Stop.	Small Stop.	Equiv. Focus.	Price.
a 3	4 x 5	4 $\frac{1}{2}$ x 7 $\frac{1}{2}$	5 x 8	5 inch.	\$28 00
a 4	4 $\frac{1}{2}$ x 7 $\frac{1}{2}$	5 x 8	6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	6 "	32 00
5	5 x 8	6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	7 x 9	7 "	40 00
6	6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	7 x 9	8 x 10	8 "	48 00
7	7 x 9	8 x 10	10 x 12	9 "	56 00
8	8 x 10	10 x 12	11 x 14	10 "	64 00
9	10 x 12	11 x 14	12 x 15	12 "	72 00
10	11 x 14	12 x 15	16 x 18	15 "	80 00
11	12 x 15	16 x 18	18 x 22	18 "	96 00
12	16 x 18	20 x 22	21 x 25	21 "	120 00

Darlot Hemispherical Wide-Angle Rectilinear View Lenses.



These Lenses embrace an angle of 90 degrees, and are valuable for taking views of buildings, interiors, etc., in confined situations, where those of longer focus cannot be used.

	Back Focus.	Size View.	Price.
No. 1,	2½ inches.....	For Stereoscopic Work, each	\$12 50
" 2,	3 "	" " " "	15 00
" 3,	5 "	8 x 10.....	20 00
" 4,	8 "	10 x 12	25 00

Darlot Rapid Hemispherical View Lenses.

These Lenses embrace an angle of from 60 to 75 degrees; are quick-acting, perfectly rectilinear, and provided with central stops. Will be found very fine lenses for landscape and outdoor groups; also for copying engravings, maps, architectural subjects, etc.

	Back Focus.	Size View.	Price.
No. 1,	5½ inches.....	5 x 6.....	\$15 00
" 2,	9 "	5 x 8.....	25 00
" 3,	10½ "	8 x 10.....	35 00

No. 1 can be had in matched pairs for Stereoscopic work.

Scovill's "Peerless" Quick Acting Stereoscopic Lenses,

FOR PORTRAITURE OR VIEWS.

The Lenses are especially designed for Stereoscopic Photography, and are so constructed that they will work well for interiors or exteriors.

They are particularly adapted for instantaneous work.

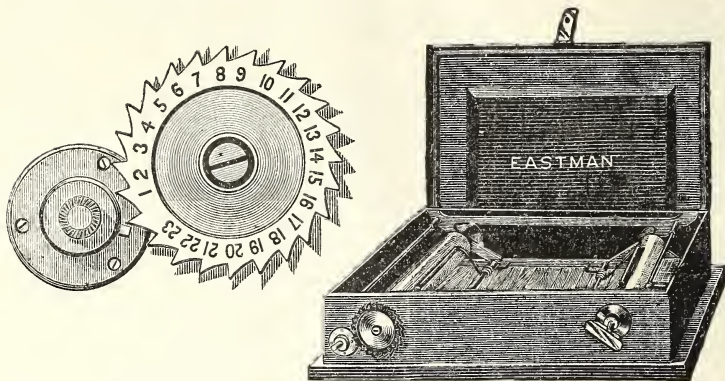
Diameter of Lenses, 1½ inch; focal length, 3½ inches.

By removing the back lens and substituting the front combination, a focal length of 5½ inches is obtained.

They are supplied with six Waterhouse diaphragms in morocco case.

Price, per pair.....	\$25 00
Imitation Dallmeyer Lens.....per pair,	9 50
" " Lenses, matched for Stereoscopic Work, "	17 00

Eastman-Walker Roll Holders.



Patented May 5, 1885. Label Registered, 1885.

Fitting Roll Holders.

We can fit Roll Holders to the standard Cameras. *An extra charge* is made for this in all cases except when the holder is sold with the camera. In ordering roll holders for old cameras it is advisable to send the camera or one of the double holders to the factory to serve as a pattern. Where this is impracticable on account of distance or otherwise, give full particulars as to make and name of camera and outside dimensions.


Each Roll-Holder has the non-detachable key and Scovill patent automatic tally.

No Roll-Holder is complete without this tally.

†3¼ x 4¼....\$12 00	5 x 8...\$20 00	16 x 20 ....\$60 00
†4 x 5 ... 15 00	6½ x 8½ 24 00	17 x 20 65 00
†4¾ x 6½.... 17 50	8 x 10... 30 00	18 x 22 75 00
*4½ x 7½.... 20 00	10 x 12... 36 00	20 x 24 80 00
5 x 7 20 00	11 x 14... 42 00	25 x 30 85 00
†5 x 7½.... 20 00	14 x 17... 50 00	

* This size is made for 5 x 8 Cameras that are too small for our regular 5 x 8 holder, viz.: Scovill's '76, and Waterbury. † English sizes. ‡ Visible indicator only.

All sizes of Roll Holders up to and including 11 x 14 carried in stock. Larger sizes to order.

 We send out with every Roll Holder a spool of plain paper, to enable the operator to learn to manipulate it in the white light.

Roll Holders.—EXTRA PARTS.

All parts of Roll Holders are made interchangeable, and any part can be furnished on application.

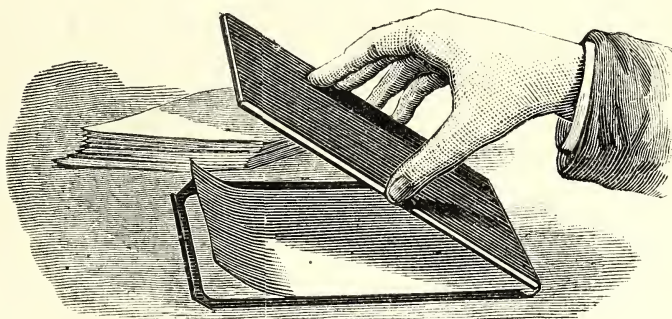
Extra Keys, old model.. . . . 25 cts each.

EXTRA REELS.

3¼ inches.....	50 cts.	11 inches.....	\$1 00
4 "	50 "	14 "	1 00
4½ "	50 "	16 "	1 25
4¾ "	50 "	17 "	1 25
5 "	50 "	18 "	1 25
6½ "	75 "	20 "	1 50
8 "	75 "	25 "	2 00
10 "	75 "		

Extra Reels enable the operator to remove the exposed paper from the roll holder without separating the exposures or rewinding the paper film, an operation that should always be avoided. Enough extra reels should be provided to carry all exposures that are intended to be made before developing. For instance, if 100 exposures are to be made on a trip, 3 extra reels are required. Each reel, as soon as full, is removed from the holder and replaced by another to take the paper from a fresh spool. The boxes in which the spools are sold serve to store the reels of exposed paper. Empty spools are thrown away.

Film Carriers.



Patented May 5, 1885.

¾ in. thick.	½ in. thick.	⅜ in. thick.	¾ in. thick.	½ in. thick.	⅜ in. thick.	¼ in. thick.
3¼ x 4¼ .. \$0 25	\$0 25	—	8 x 10.. \$0 50	\$0 50	\$0 50	—
4 x 5 .. 30	30	—	10 x 12.. —	—	60	—
4¾ x 6½ .. 30	—	—	11 x 14.. —	—	75	—
5 x 7 .. 35	—	35	14 x 17.. —	—	1 00	—
5 x 7½ .. 35	—	—	16 x 20.. —	—	—	\$1 25
5 x 8 .. 35	35	35	18 x 22.. —	—	—	1 50
6½ x 8½ .. 40	40	40	20 x 24.. —	—	—	1 75

* Sizes not mentioned are not made and cannot be furnished.

In ordering carriers specify which thickness is wanted. The thicker the carrier the more rigid.

Double Holders that have the plate slide in from the end require the thinnest carrier, (¾).

The Daisy Holder will take the ½ inch carriers when the septum is removed. As the carriers are opaque, the septum is not required.

Wet Plate Holders require the ¾ carriers.

SCOVILL M'FG CO., Publishers.

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to my address:

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NOTE.—Please specify whether Weekly or Monthly edition is desired.

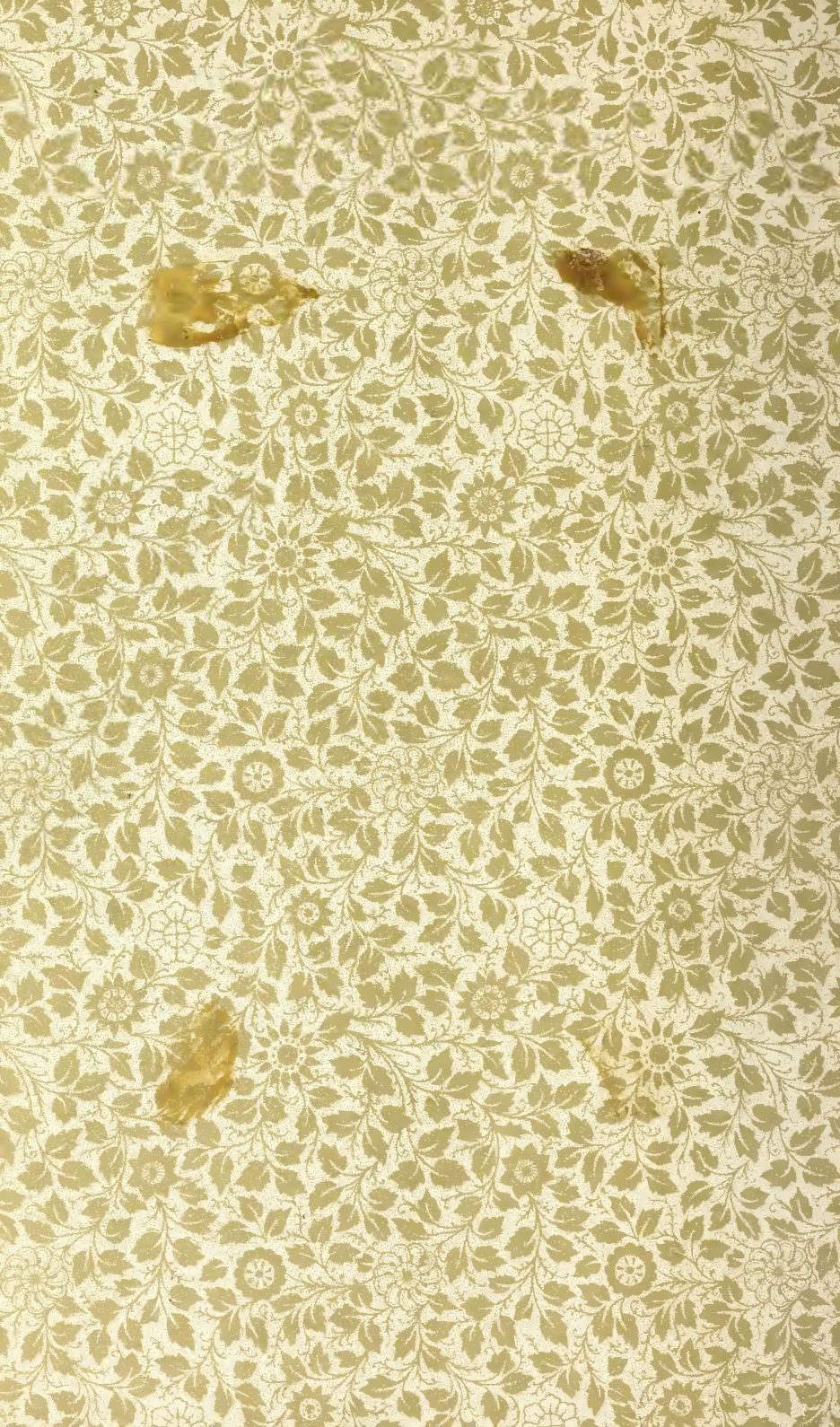
M. A. Seed

#23 Plate

#25 in letter to Dr.

5/89
IKXX

2651



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92-B
28114

